CITY OF WESTFIELD
Stormwater Management Technical Standards Manual

SECTION 03800

CITY OF WESTFIELD
STORMWATER MANAGEMENT TECHNICAL STANDARD DETAILS

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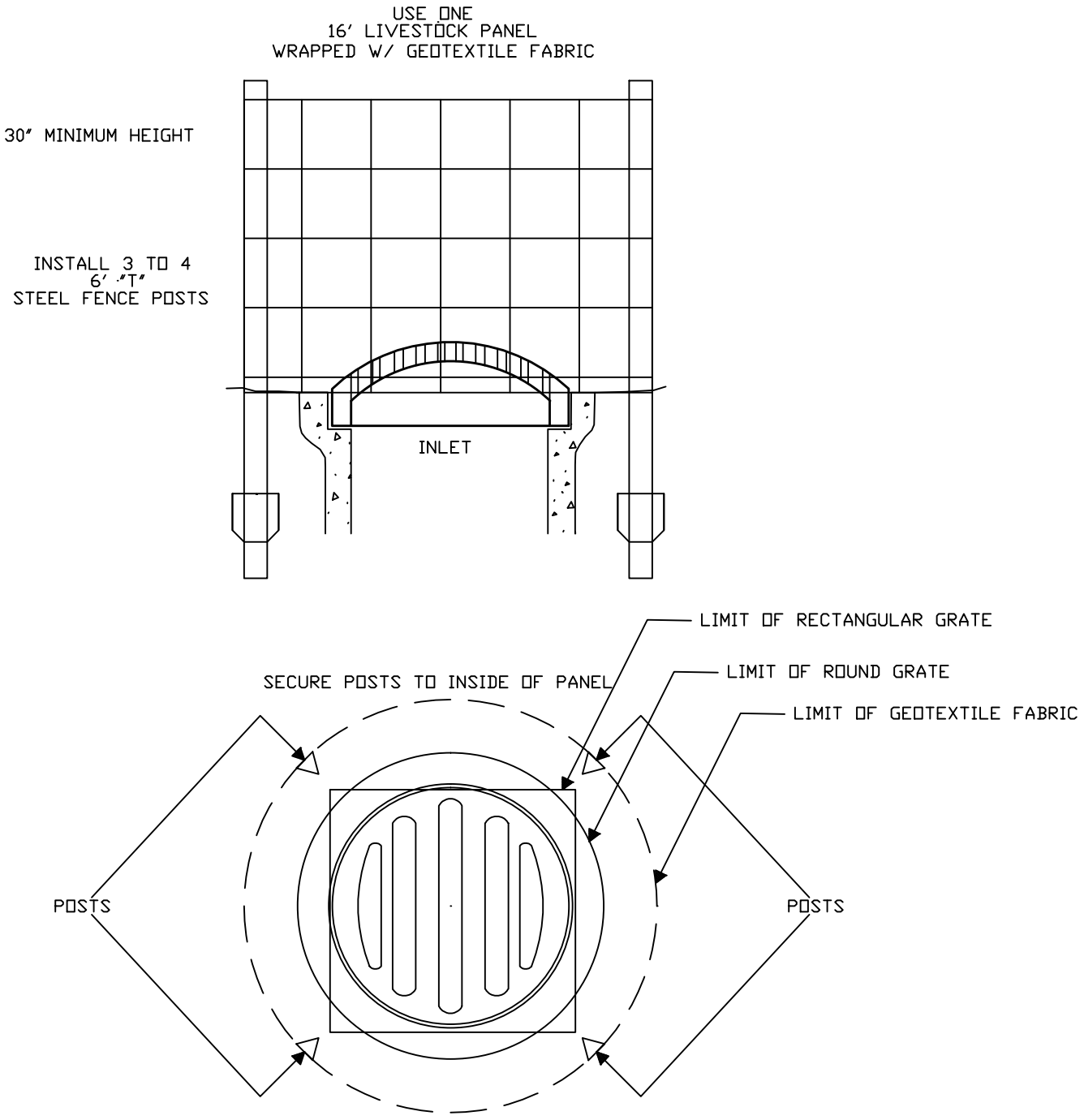

TEMPORARY DITCH INLET PROTECTION

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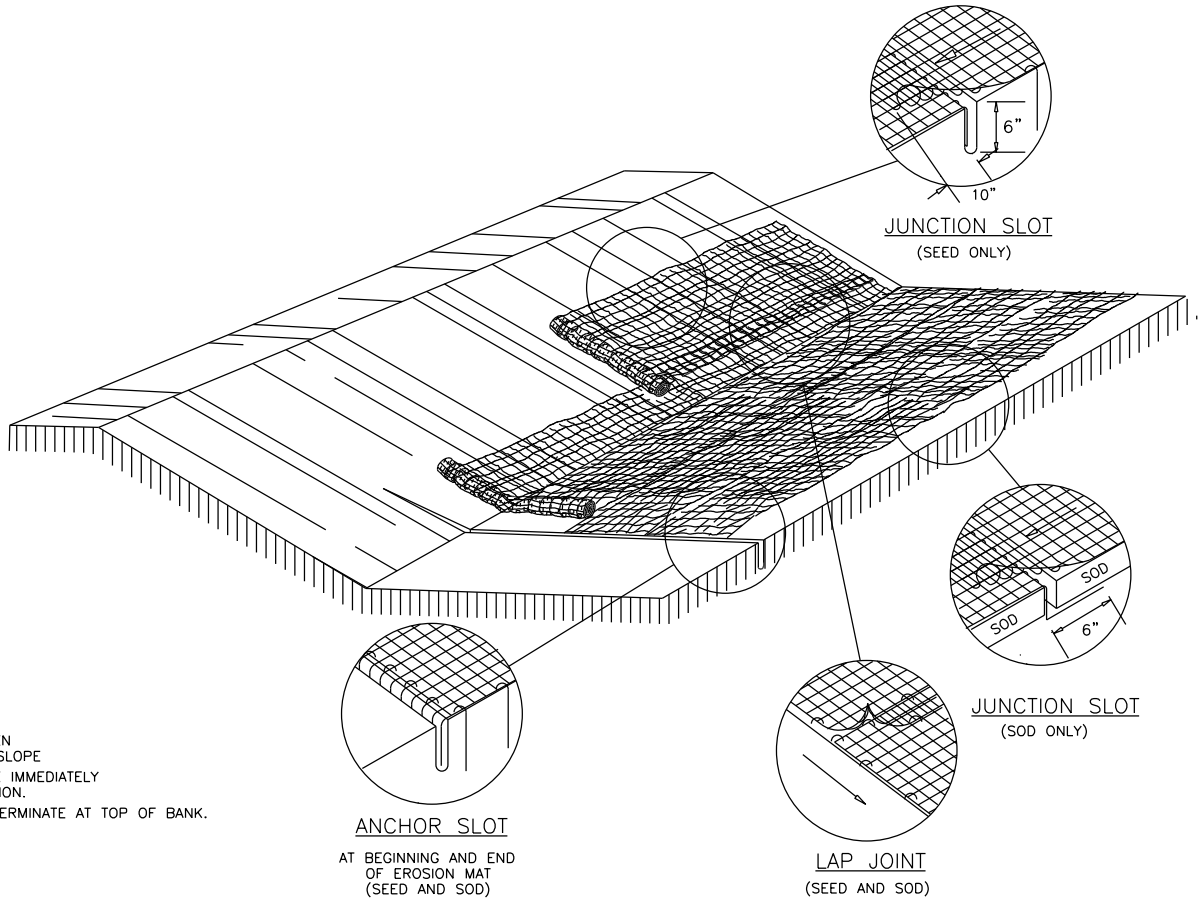
FIGURE EC-1

GENERAL NOTES

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING APPLICATION OF LIME, FERTILIZER AND SEED.
2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE BLANKET IN A 6" DEEP x 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
3. ROLL CENTER BLANKET IN DIRECTION OF WATER FLOW ON BOTTOM OF CHANNEL.
4. PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH A 6" OVERLAP. USE A DOUBLE ROW OF STAGGERED STAPLES 4" APART TO SECURE BLANKETS.
5. FULL LENGTH EDGE OF BLANKETS AT TOP OF SIDE SLOPES MUST BE ANCHORED IN 6" DEEP x 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
6. BLANKETS ON SIDE SLOPES MUST BE OVERLAPPED 4" OVER THE CENTER BLANKET AND STAPLED.
7. IN MEDIUM/HIGH FLOW CHANNEL APP-LICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FOOT INTERVALS. USE A ROW OF STAPLES 4" APART OVER ENTIRE WIDTH OF THE CHANNEL. PLACE A SECOND ROW 4" BELOW THE FIRST ROW IN A STAGGERED PATTERN.
8. THE TERMINAL END OF THE BLANKETS MUST BE ANCHORED IN A 6" DEEP x 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
8. BLANKET TYPE TO BE NORTH AMERICAN GREEN S75 OR S150 (OR SIMILAR) DEPENDING ON SLOPE
9. SILT FENCING INSTALLATION SHALL COMMENCE IMMEDIATELY FOLLOWING EROSION CONTROL MAT INSTALLATION.
10. EROSION CONTROL MAT SHALL BEGIN AND TERMINATE AT TOP OF BANK.



EROSION CONTROL MAT – SLOPE DETAIL

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REGISTERED
No.
11300022
STATE OF
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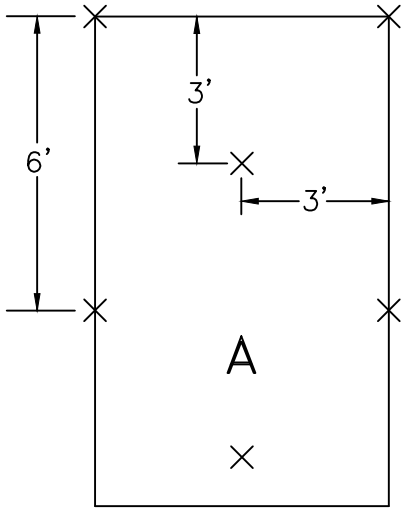
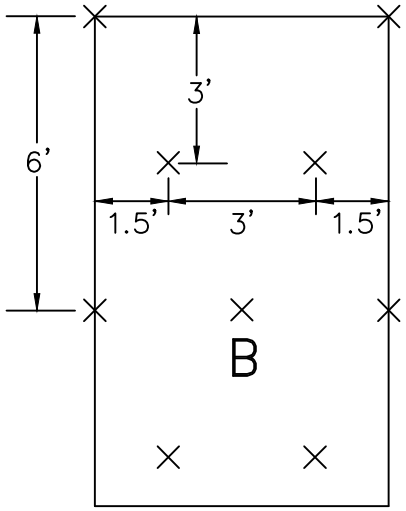
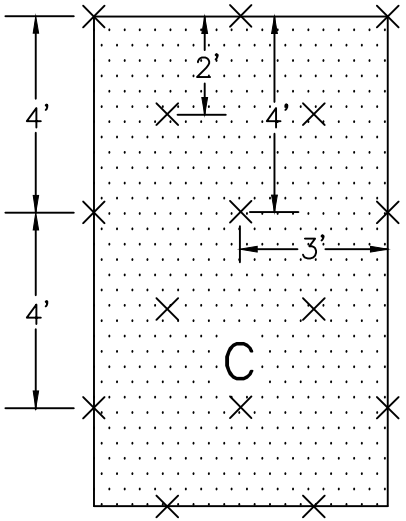
FIGURE EC-02



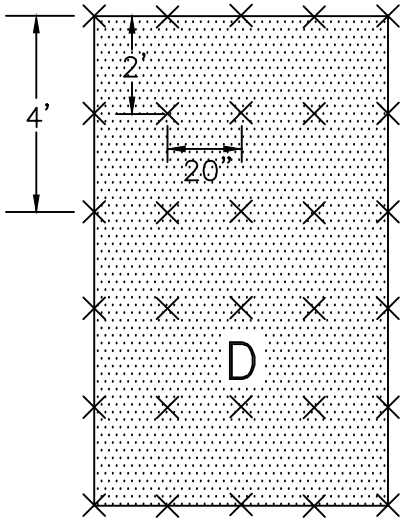
1 STAPLE PER SQ. YD.



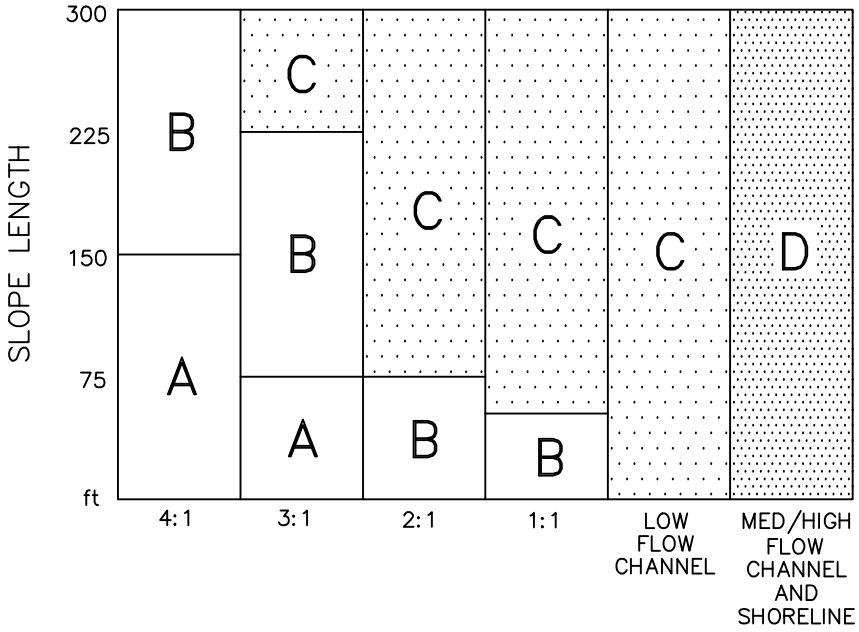
1.5 STAPLES PER SQ. YD.



2 STAPLES PER SQ. YD.



3.5 STAPLES PER SQ. YD.



EROSION CONTROL MAT – STAPLE GUIDE

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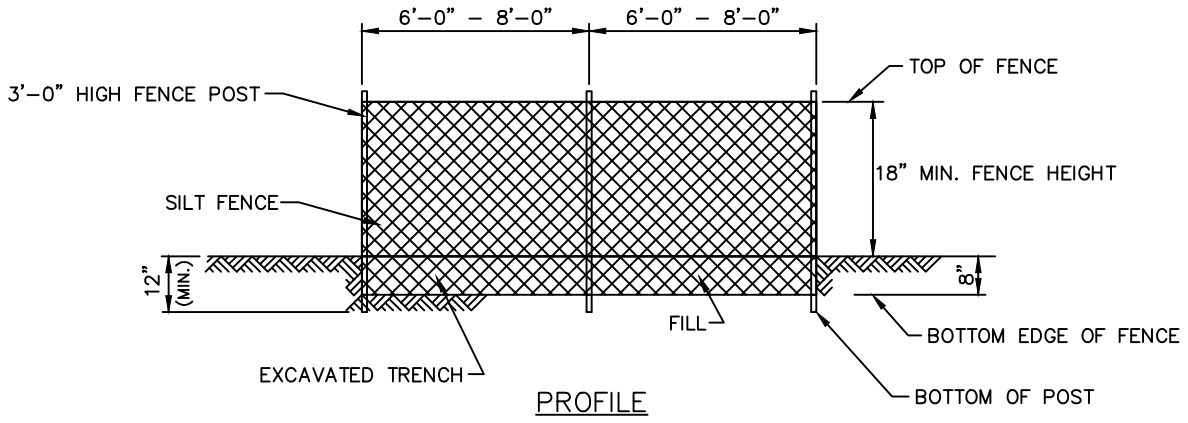
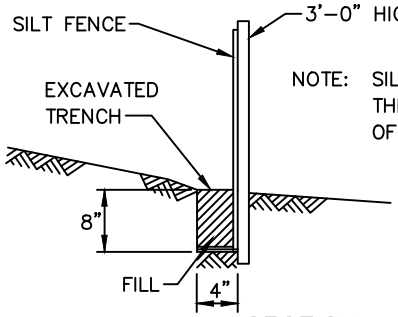
FIGURE EC–3



PROFILE



NOTE: SILT FENCE WILL BE TOED–IN ON THE UPHILL SIDE AT A MINIMUM OF 8 INCHES.

SECTION

INSTALLATION PROCEDURE

1. 2" x 2" X 36" HARDWOOD OR STEEL FENCE POSTS ARE INSTALLED 6' APART (w/ EXTRA STRENGTH FABRIC WITHOUT WIRE BACKING) OR 8' APART (w/ WIRE BACKING), ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE.
2. A TRENCH 4" WIDE BY 8" DEEP IS DUG ALONG THE UPHILL SIDE OF THE FENCE LINE.
3. THE SILT FENCE IS UNROLLED AND LAID OUT ALONG THE FENCE LINE.
4. AT THIS TIME THE LOWER 8" OF THE FENCE IS LAID IN THE TRENCH AND CURLED TOWARD THE EROSION SOURCE. THE TRENCH IS THEN BACKFILLED WITH SOIL.

SILT FENCE DETAIL

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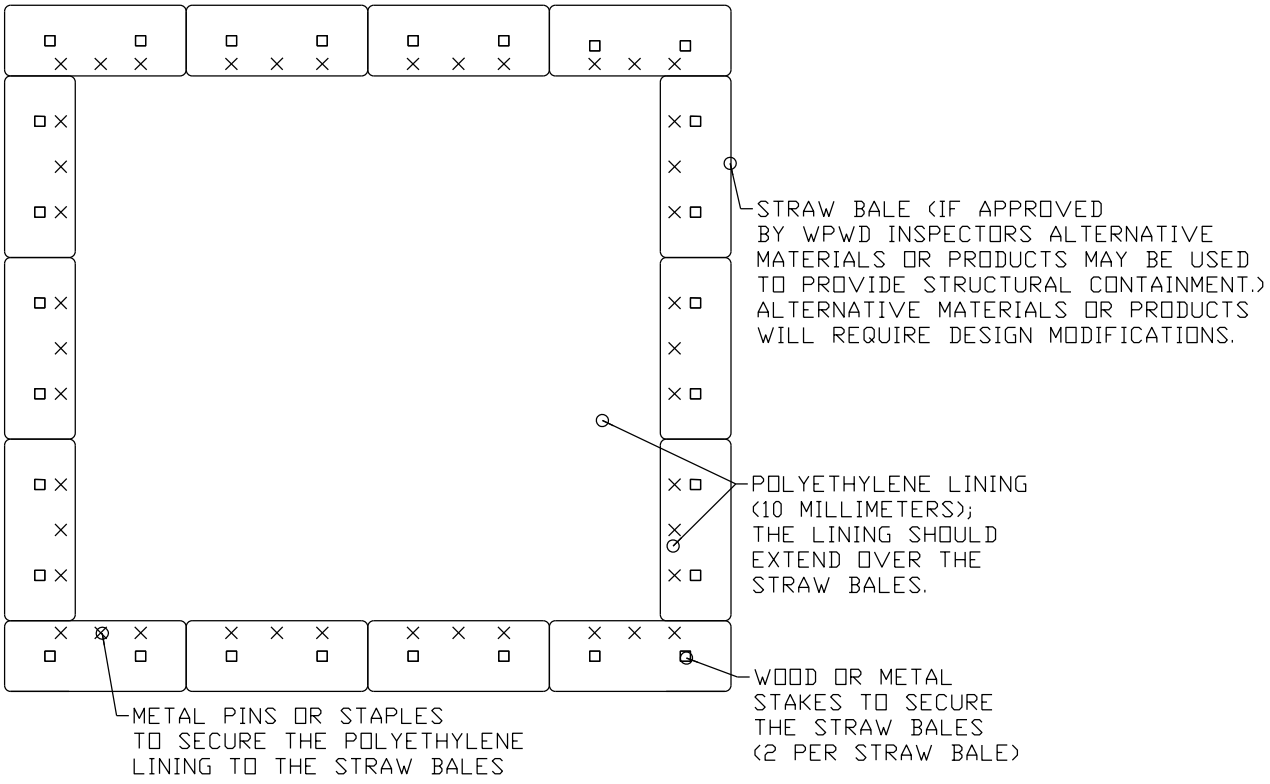
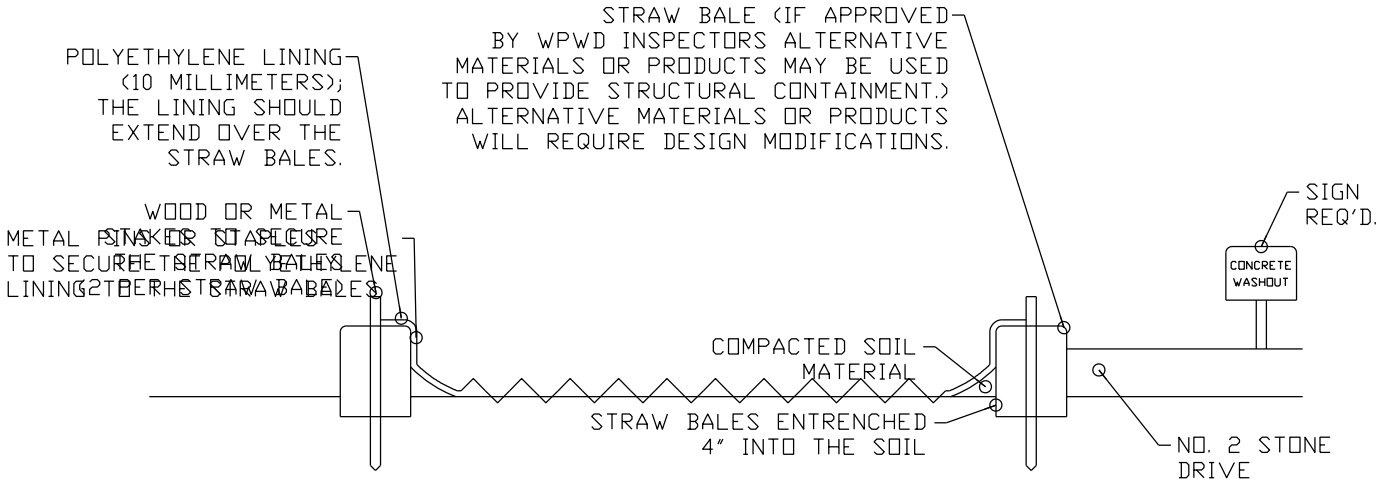
FIGURE EC–4





CONCRETE WASHOUT DETAIL

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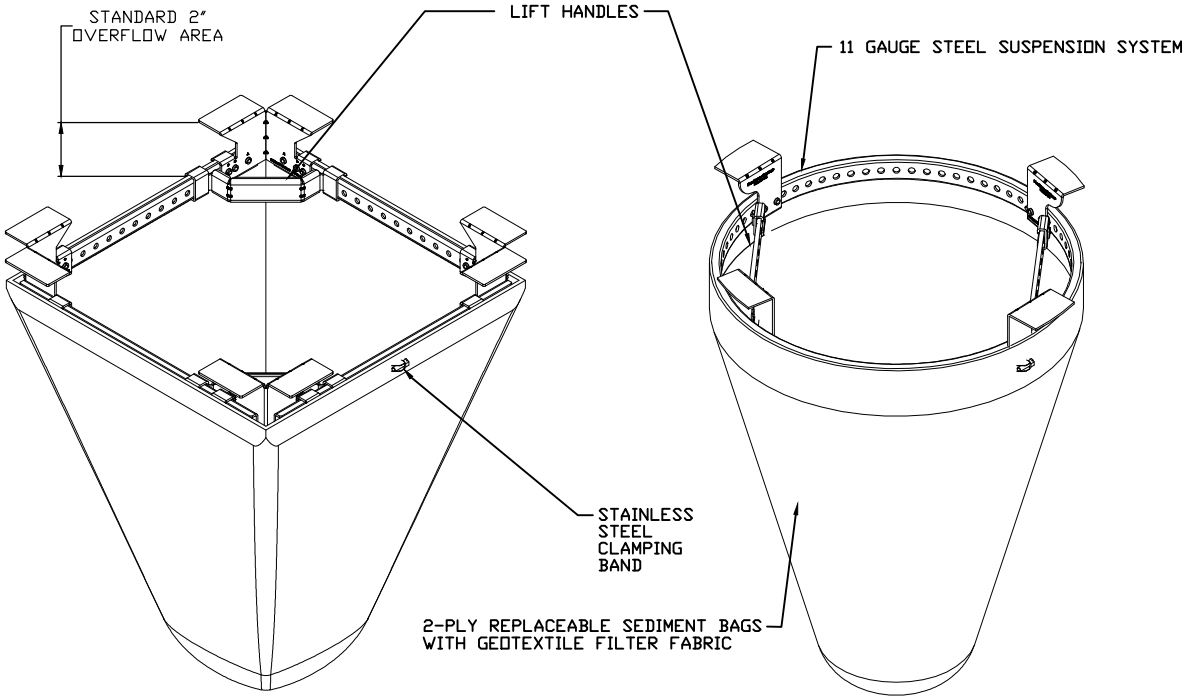
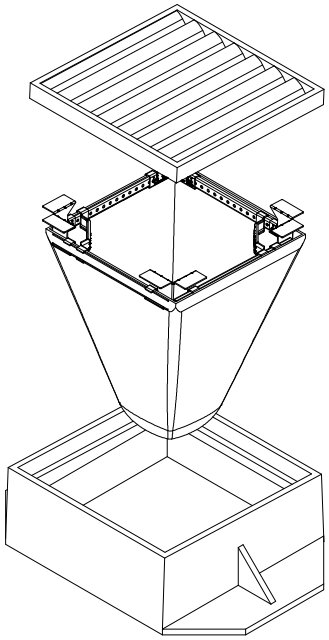
FIGURE EC-05



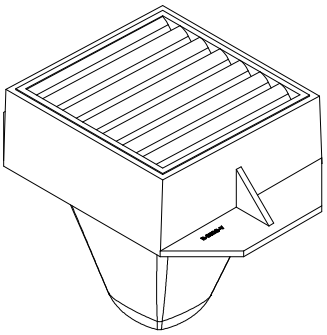
TYPICAL FLAT/RECTANGULAR/ROLLED CURB INLET FILTER

TYPICAL ROUND INLET FILTER

IPP *FLe* Xstorm Inlet Filter Specifications			
Material Property	***Test Method***	***Value (min ave)***	
> Inner Filter Bag Specs (2 ft^3 min vol)		**Non-Woven**	**Woven Mono**
Grab Tensile	ASTM D 4632	100 lbs	200 lbs
Puncture Strength	ASTM D 4833	65 lbs	90 lbs
Trapezoidal Tear	ASTM D 4533	45 lbs	75 lbs
UV Resistance	ASTM D 4355	70% at 500 hrs	90%
App Open Size (AOS)	ASTM D 4751	70 sieve (.212 mm)	40 sieve (.425 mm)
Permittivity	ASTM D 4491	2.0 /sec	2.1/sec
Water Flow Rate	ASTM D 4491	145 gpm/sqft	145 gpm/sqft
> Polyester Outer Reinforcement Bag Specifications			
Weight	ASTM D 3776	4.55 oz/sqyd +/- 15%	
Thickness	ASTM D 1777	.040 +/- .005	
> Frame Construction			
A36 Structural Steel; 11 Guage; Zinc Plated	ASTM A 576	*Tensile Strength > 58,000 psi; Yield Strength > 36,000 psi*	



INSTALLATION:
1. REMOVE GRATE
2. DROP INLET FILTER ONTO LOAD BEARING LIP OF CASTING OR CONCRETE STRUCTURE
3. REPLACE GRATE



INLET PROTECTION

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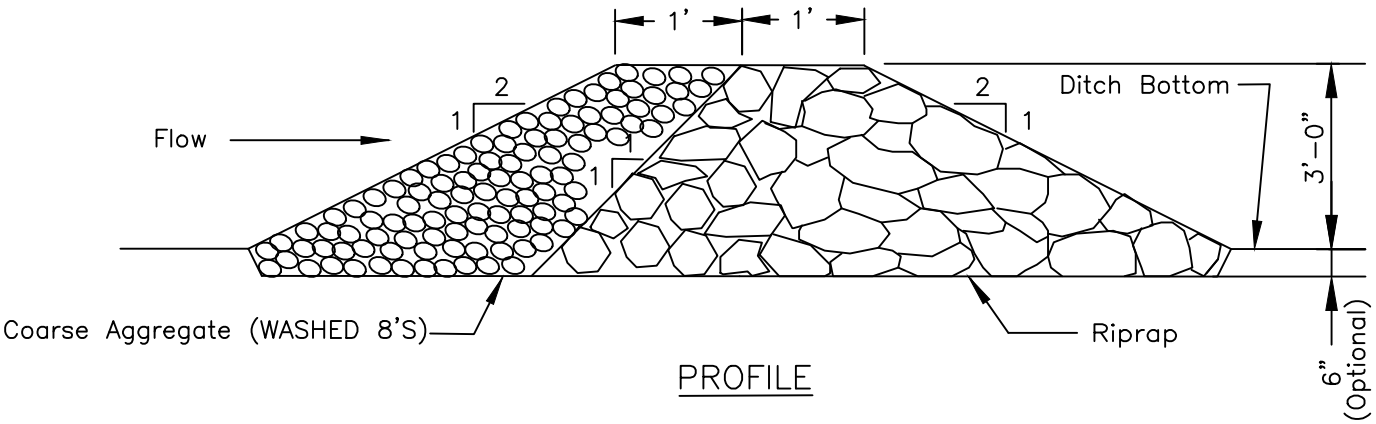
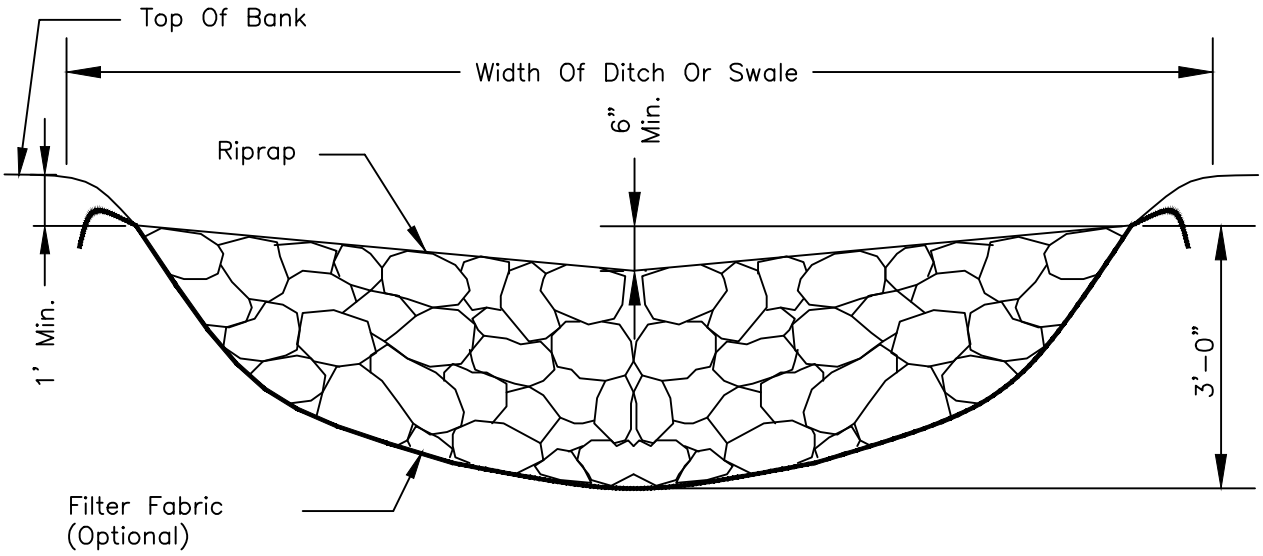
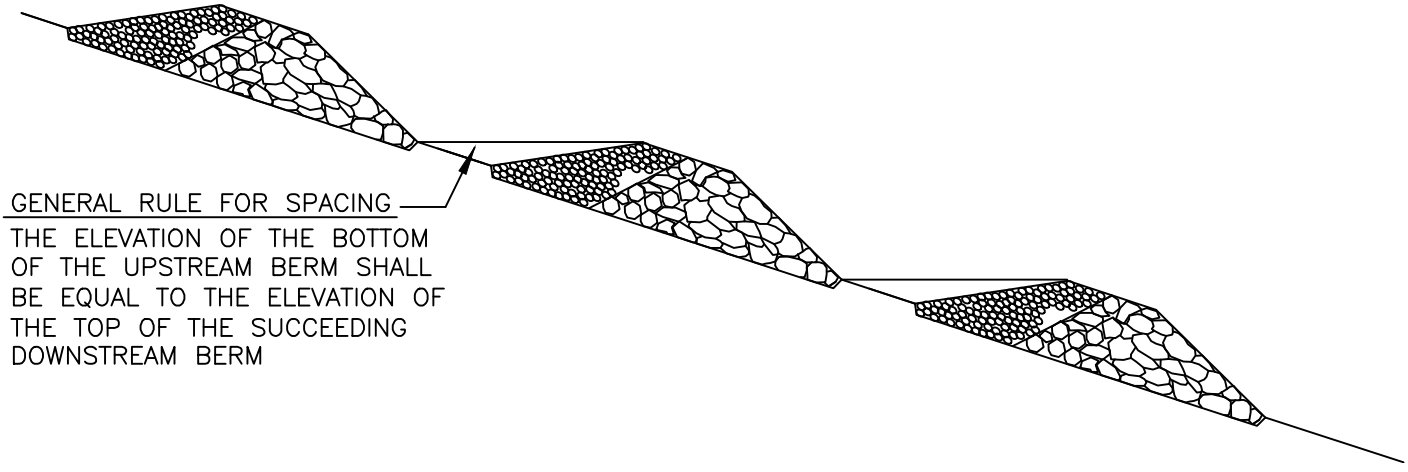
FIGURE EC-6



PROFILE



CROSS SECTION
DOWNSTREAM VIEW



GENERAL RULE FOR SPACING

THE ELEVATION OF THE BOTTOM OF THE UPSTREAM BERM SHALL BE EQUAL TO THE ELEVATION OF THE TOP OF THE SUCCEEDING DOWNSTREAM BERM

ROCK CHECK DAM – RIPRAP

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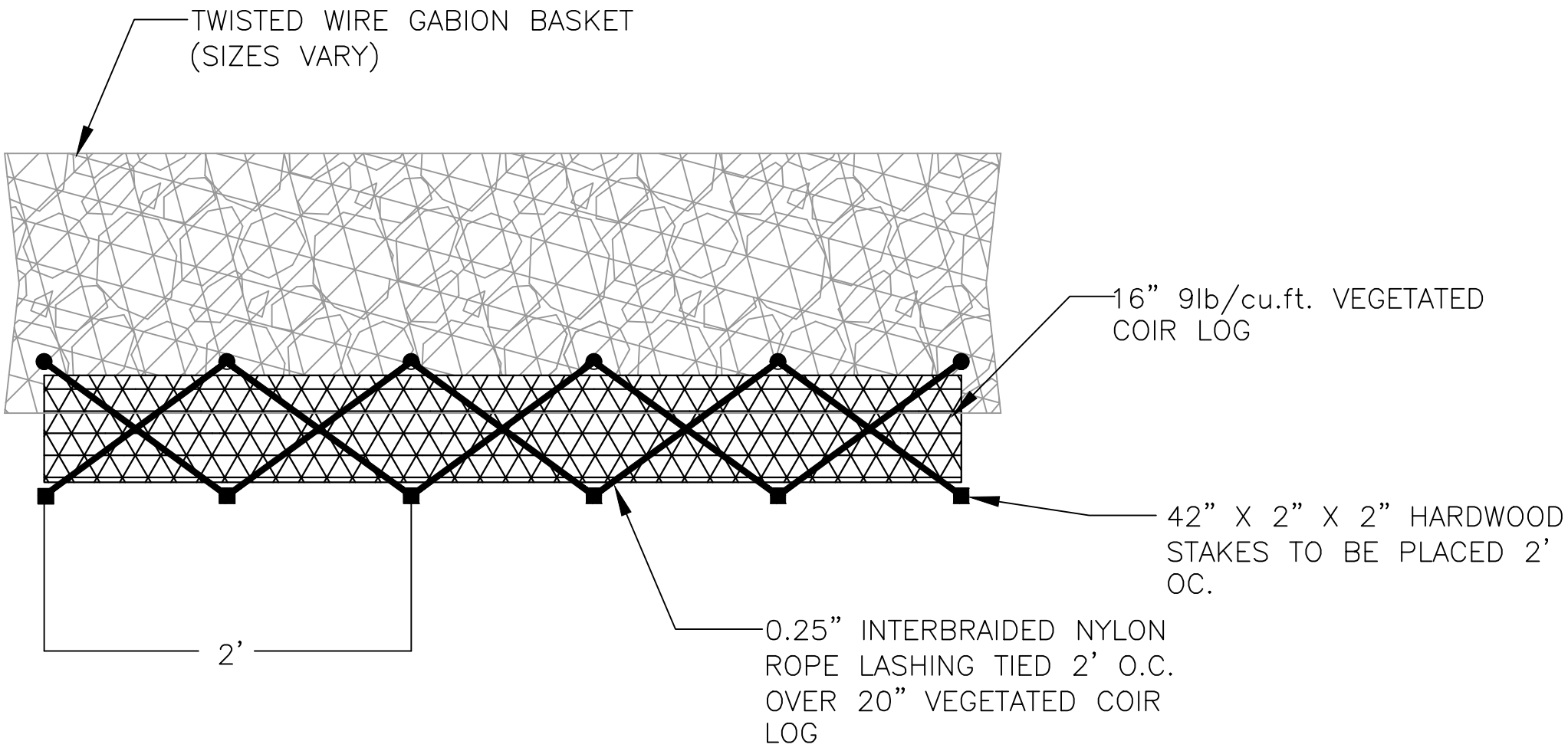
FIGURE EC-7



GABION ANCHOR DETAIL

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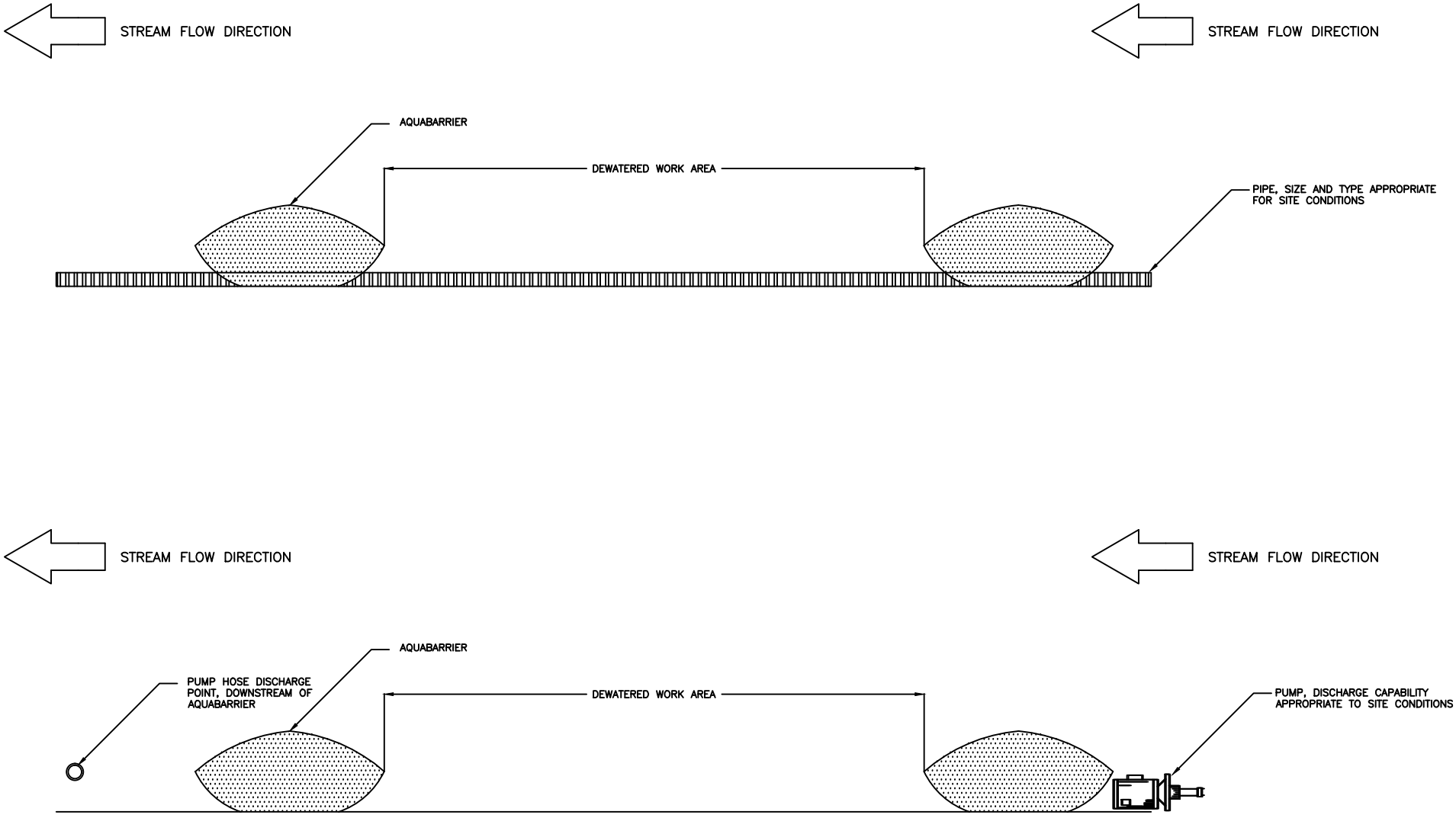
FIGURE EC-08



TYPICAL AQUABARRIER DETAIL

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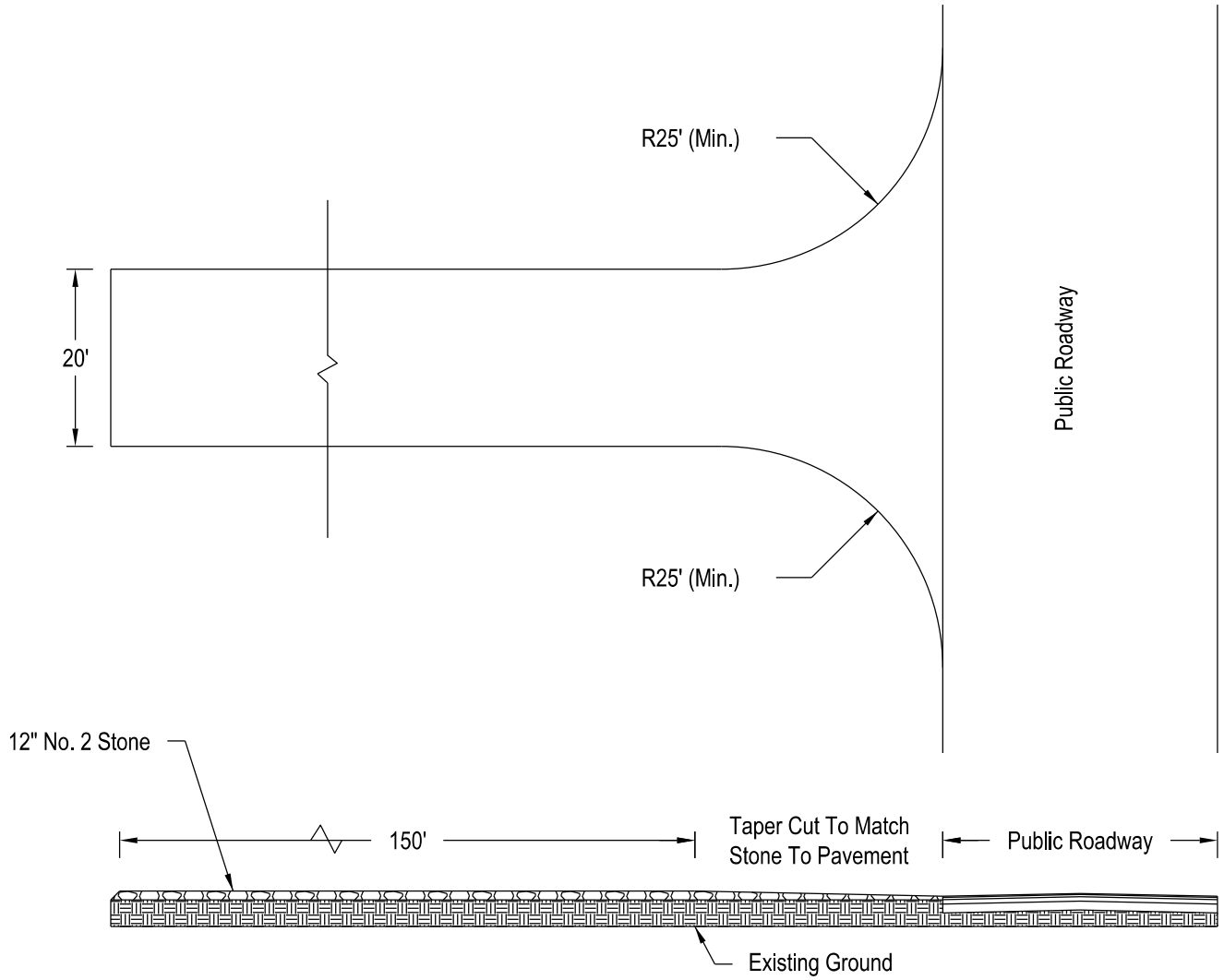
FIGURE EC–09



TEMPORARY CONSTRUCTION DRIVE

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PHILLIP A. SUNDLING
REGISTERED
No.
11300022
STATE OF
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PROFESSIONAL ENGINEER

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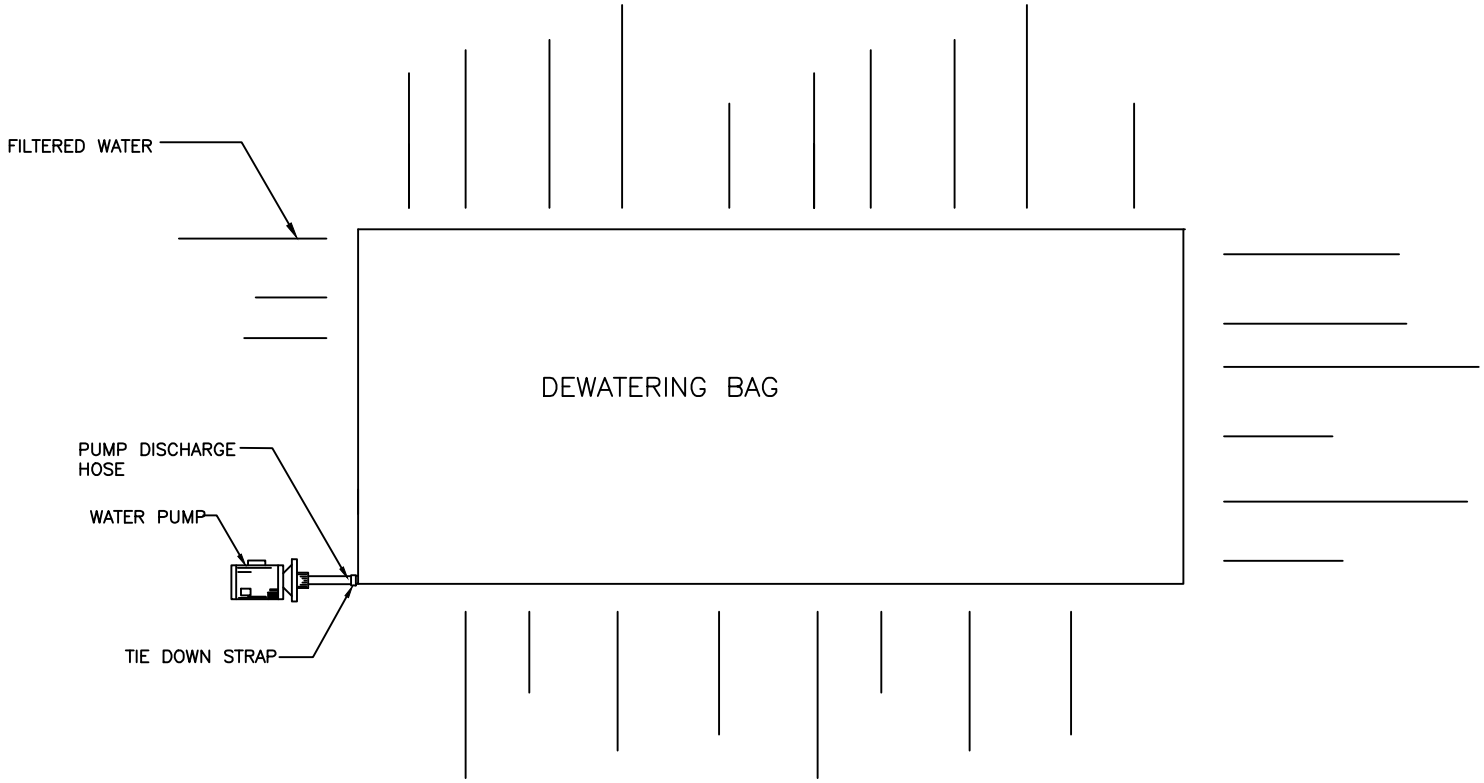
FIGURE EC-10



Dewatering Filtration Bag Size	Maximum Gallon Per Minute Capacity
4' x 6'	228
7.5' x 7.5'	534
10' x 10'	950
10' x 15'	1,425
15' x 15'	2,137
15' x 30'	4,275
15' x 65'	9,262

INSTALLATION AND MAINTENANCE GUIDELINES

INSTALLATION: PLACE LIFTING STRAPS (NOT INCLUDED) UNDER THE UNIT TO FACILITATE REMOVAL AFTER USE. UNFOLD D2 DEWATERING BAG ON A STABILIZED AREA OVER DENSE VEGETATION, STRAW OR OTHER COVER. PLACE BAG OVER OPEN GRADED STONE TO ACHIEVE MAXIMUM FILTRATION AND DRAINAGE. INSERT DISCHARGE HOSE FROM PUMP INTO D2 DEWATERING BAG A MINIMUM OF SIX INCHES AND TIGHTLY SECURE WITH THE ATTACHED STRAP TO PREVENT WATER FROM FLOWING OUT OF THE UNIT WITHOUT BEING FILTERED. IF USING OPTIONAL ABSORBENTS, PLACE ABSORBENT BOOM INTO THE D2 DEWATERING BAG. CLIP ABSORBENT BOOM TO TETHER PROVIDED INSIDE THE UNIT.

MAINTENANCE: REPLACE THE UNIT WHEN ½ FULL OF SEDIMENT OR WHEN SEDIMENT HAS REDUCED THE FLOW RATE OF THE PUMP DISCHARGE TO AN IMPRACTICAL RATE. IF USING OPTIONAL OIL ABSORBENTS; REMOVE AND REPLACE ABSORBENT WHEN NEAR SATURATION.

DEWATERING DETAIL AND SIZE CHART

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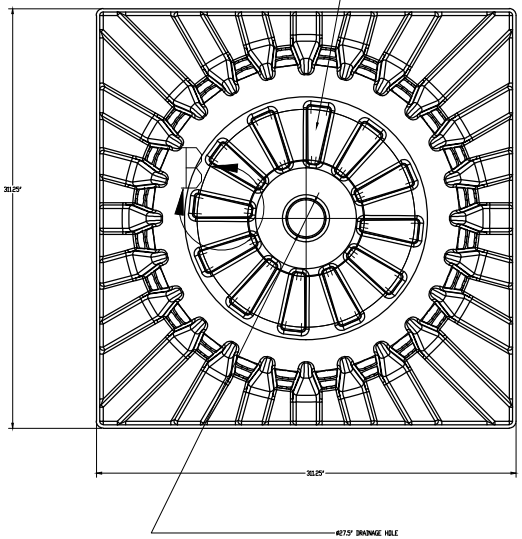
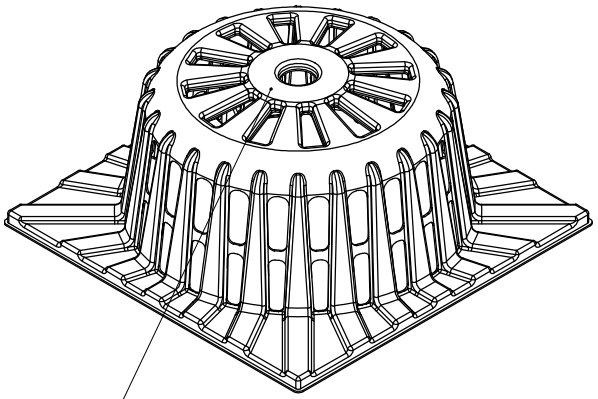
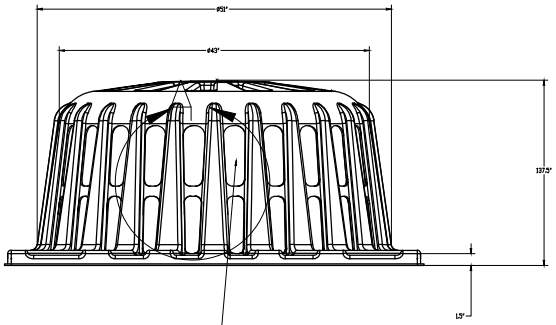
FIGURE EC–11

TWELVE DRAINAGE SLOTS IN TOP

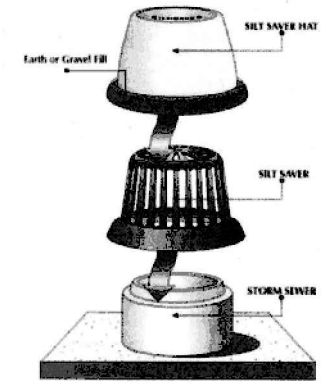


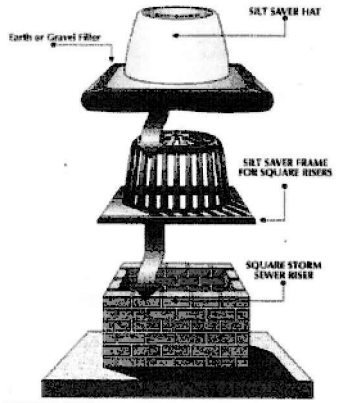


SILT-SAVER LOGO AND PATENT NO. MOLDED INTO PART. SILT-SAVER LABEL IS PLACED OVER LOGO AREA ON OUTSIDE OF PART.



FORTY EIGHT DRAINAGE SLOTS AROUND PERIMETER





Weight	D-3776	3.0 oz y^2
Tensile strength	D-4632	80lbs
Elongation	D-4632	50%
Mullen burst	D-3786	150
Puncture strength	D-4833	50
Trapezoid tear	D-4533	30
AOS-US std sieve	D-4751	70
Permittivity, -1 *	D-4491	2.0
Flow *	D-4491	102 gal/min/ft2
U.V. Resistance, %	D-4355 (500 hrs)	70

* Due to the variations in soil conditions, (soil types, soil stability, etc.) Silt-Saver, Inc. does not specify long-term effectiveness, (resistance to clogging). If this is a concern, one may want to conduct a gradient ratio test that will compare a specific soils hydraulic gradient to the hydraulic through the filter.

SILT SAVER SQUARE INLET PROTECTION DETAIL

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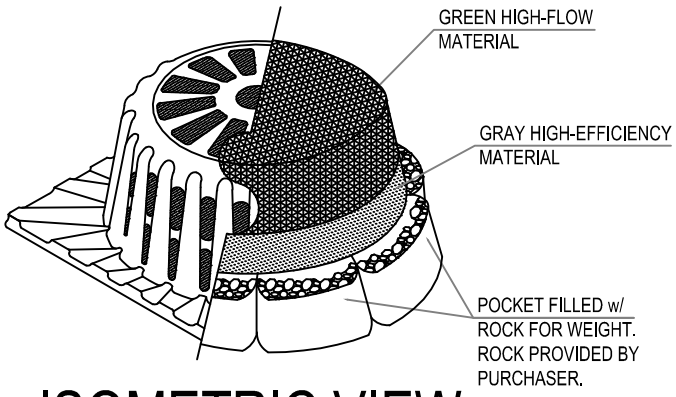
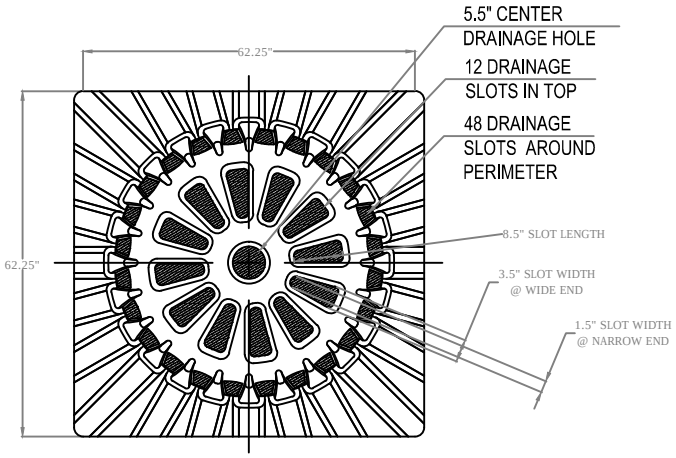
FIGURE EC–12

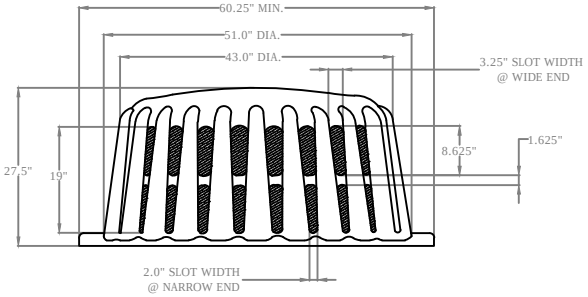


ISOMETRIC VIEW

SHOWN WITH ROADWAY PROJECTS FILTER HAT



PLAN VIEW



ELEVATION VIEW

REPLACEMENT FILTERS: MODEL # S-240

FILTER OPTIONS

FILTER HAT IS AVAILABLE IN THREE OPTIONS:

1) ALL HIGH-FLOW MATERIAL
2) ALL HIGH-EFFICIENCY MATERIAL
3) HIGH-FLOW MATERIAL ON TOP HALF OF HAT, HIGH-EFFICIENCY MATERIAL ON BOTTOM HALF (THIS FILTER COVER IS RECOMMENDED FOR ALL ROADWAY PROJECTS.)

IT IS THE PURCHASERS RESPONSIBILITY TO PURCHASE APPROPRIATE FILTER HAT. PURCHASER SHALL PROVIDE ROCK FOR FILTER POCKETS.

FILTER HAT INSTALLATION

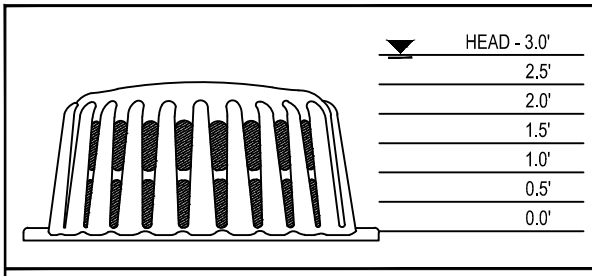
FILTER HAT SLIDES DIRECTLY OVER FILTER FRAME. TO KEEP FILTER FRAME IN PLACE OVER STORM STRUCTURE, ROCK POCKETS ARE SEWN DIRECTLY INTO FILTER HAT MATERIAL. EVERY FILTER HAT COMES IN ONE PIECE FOR EASY INSTALLATION.

MAINTENANCE

ALL TEMPORARY EROSION, SEDIMENTATION, & POLLUTION CONTROL PRACTICES SHOULD BE INSPECTED DAILY. CONTRACTOR SHALL REMOVE SEDIMENT AND DISPOSE OF IN A PROPER MANNER. INSPECT S-200A DAILY FOR CUTS, ABRASIONS, AND PROPER INSTALLATION. REPLACE OR REPOSITION AS NECESSARY.

SPECIFICATIONS

FILTER FABRIC SILT-SAVER HAT SHALL BE BASED ON DESIGN PROFESSIONAL'S SPECIFICATIONS.



FRAME & FILTER DISCHARGE ANALYSIS

HEAD (FT)	EQUATION USED	OPENING AREA (SF)	FRAME FLOW (CFS)	FILTER AREA (SF)	FILTERED FLOW (CFS)
0.5	O	2.1	7	6	2
1.0	O	3.9	19	12	3
1.5	O	7.0	41	18	5
2.0	O	8.0	54	24	7
2.5	O	9.2	70	30	9
3.0	O	9.2	77	—	77

DUE TO NARROW SLOT, A TRANSITION WILL OCCUR BETWEEN WEIR AND ORIFICE CONDITIONS. ORIFICE FLOW WILL PROVIDE A MORE CONSERVATIVE ESTIMATE OF FLOW, THEREFORE THE LESSER OF THE ORIFICE AND WEIR FLOWS WILL BE USED FOR EACH STAGE CALCULATION.

FILTER MATERIAL ALLOWS 129 gpm/SF OR 0.29cfs/SF
ORIFICE EQUATION (O) = Q=0.6A(2gh)^0.5
P = FEET PERIMETER
h = HEAD IN FEET
Q = CAPACITY IN cfs
A = FREE OPEN AREA OF FRAME
g = 32.2 FEET-PER-SECOND/SECOND

SILT SAVER INLET PROTECTION MODEL #S-200

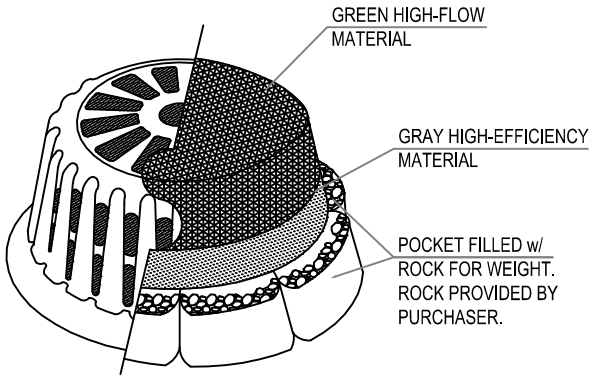
CITY OF Westfield INDIANA

NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

CITY OF WESTFIELD, INDIANA

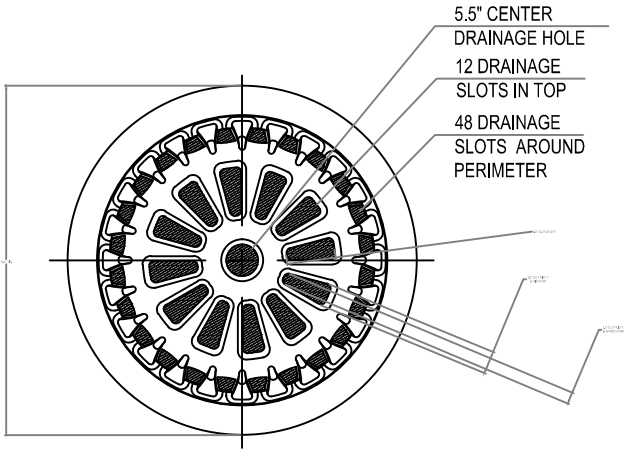
4/1/14
DATE

FIGURE EC-14

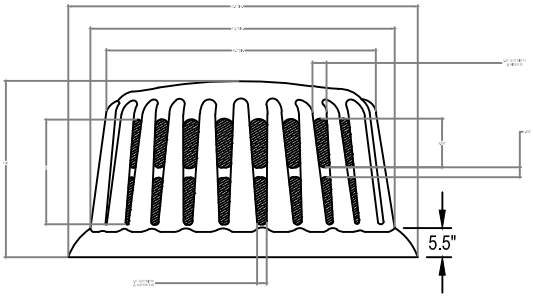


ISOMETRIC VIEW

SHOWN WITH ROADWAY PROJECTS FILTER HAT



PLAN VIEW



ELEVATION VIEW

REPLACEMENT FILTERS: MODEL # R-140

FILTER OPTIONS

FILTER HAT IS AVAILABLE IN THREE OPTIONS:
1) ALL HIGH-FLOW MATERIAL
2) ALL HIGH-EFFICIENCY MATERIAL
3) HIGH-FLOW MATERIAL ON TOP HALF OF HAT, HIGH-EFFICIENCY MATERIAL ON BOTTOM HALF (THIS FILTER COVER IS RECOMMENDED FOR ALL ROADWAY PROJECTS.)

IT IS THE PURCHASERS RESPONSIBILITY TO PURCHASE APPROPRIATE FILTER HAT. PURCHASER SHALL PROVIDE ROCK FOR FILTER POCKETS.

FILTER HAT INSTALLATION

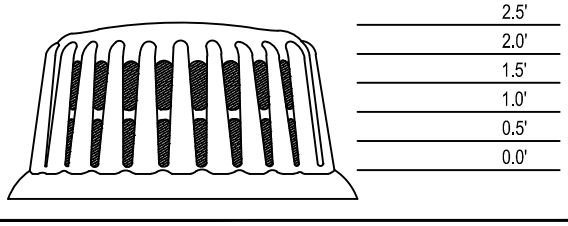
FILTER HAT SLIDES DIRECTLY OVER FILTER FRAME. TO KEEP FILTER FRAME IN PLACE OVER STORM STRUCTURE, ROCK POCKETS ARE SEWN DIRECTLY INTO FILTER HAT MATERIAL. EVERY FILTER HAT COMES IN ONE PIECE FOR EASY INSTALLATION.

MAINTENANCE

ALL TEMPORARY EROSION, SEDIMENTATION, & POLLUTION CONTROL PRACTICES SHOULD BE INSPECTED DAILY. CONTRACTOR SHALL REMOVE SEDIMENT AND DISPOSE OF IN A PROPER MANNER. INSPECT R-100A DAILY FOR CUTS, ABRASIONS, AND PROPER INSTALLATION. REPLACE OR REPOSITION AS NECESSARY.

SPECIFICATIONS

FILTER FABRIC SILT-SAVER HAT SHALL BE BASED ON DESIGN PROFESSIONAL'S SPECIFICATIONS.



FRAME & FILTER DISCHARGE ANALYSIS

HEAD (FT)	EQUATION USED	OPENING AREA (SF)	FRAME FLOW (CFS)	FILTER AREA (SF)	FILTERED FLOW (CFS)
0.5	O	2.1	7	6	2
1.0	O	3.9	19	12	3
1.5	O	7.0	41	18	5
2.0	O	8.0	54	24	7
2.5	O	9.2	70	30	9
3.0	O	9.2	77	—	77

DUE TO NARROW SLOT, A TRANSITION WILL OCCUR BETWEEN WEIR AND ORIFICE CONDITIONS. ORIFICE FLOW WILL PROVIDE A MORE CONSERVATIVE ESTIMATE OF FLOW, THEREFORE THE LESSER OF THE ORIFICE AND WEIR FLOWS WILL BE USED FOR EACH STAGE CALCULATION.

FILTER MATERIAL ALLOWS 129 gpm/SF OR 0.29cfs/SF
ORIFICE EQUATION (O) = $Q=0.6A(2gh)^{0.5}$
P = FEET PERIMETER
h = HEAD IN FEET
Q = CAPACITY IN cfs
A = FREE OPEN AREA OF FRAME
g = 32.2 FEET-PER-SECOND/SECOND

SILT SAVER INLET PROTECTION MODEL #R-100

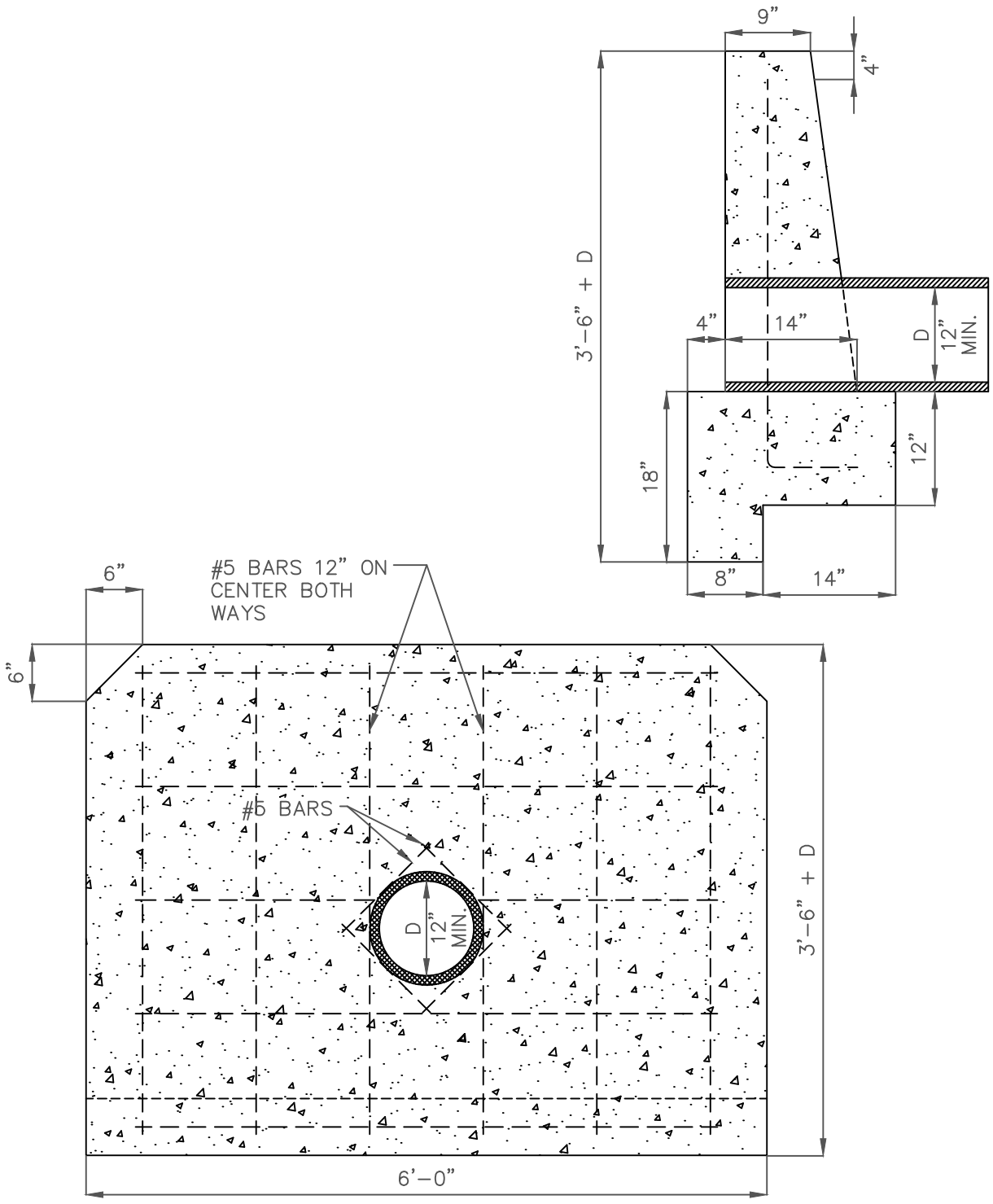
CITY OF Westfield INDIANA

NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

CITY OF WESTFIELD, INDIANA

Neil B. VanTrees 4/1/14
DATE

FIGURE EC-15



STRAIGHT HEADWALL

CITY OF Westfield INDIANA

NEIL B. VANTREES
REGISTERED
No.
10809092
STATE OF
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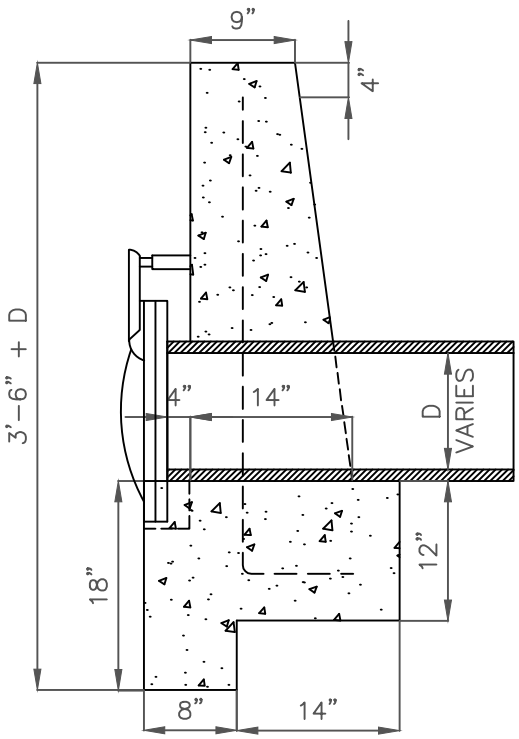
PROFESSIONAL ENGINEER

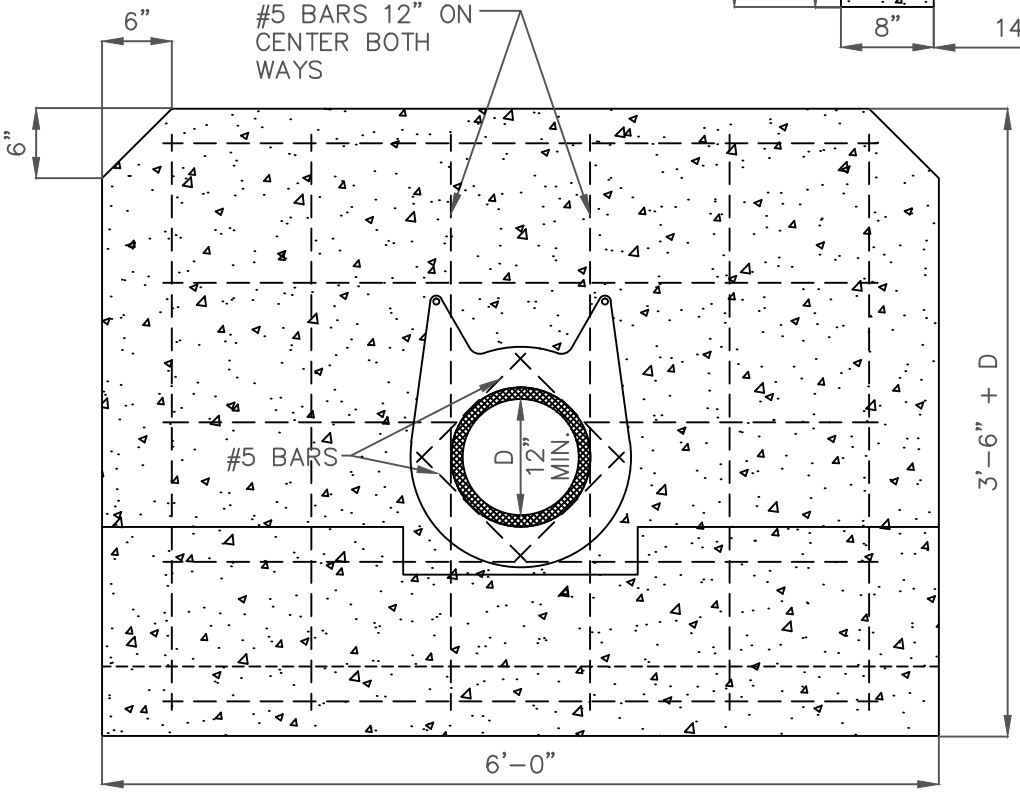
CITY OF WESTFIELD, INDIANA

4/1/14
DATE

FIGURE ST–3

RODNEY HUNT SERIES FV–AC FLAP GATE REQUIRED, OR APPROVED EQUAL.





STRAIGHT HEADWALL WITH FLAP GATE

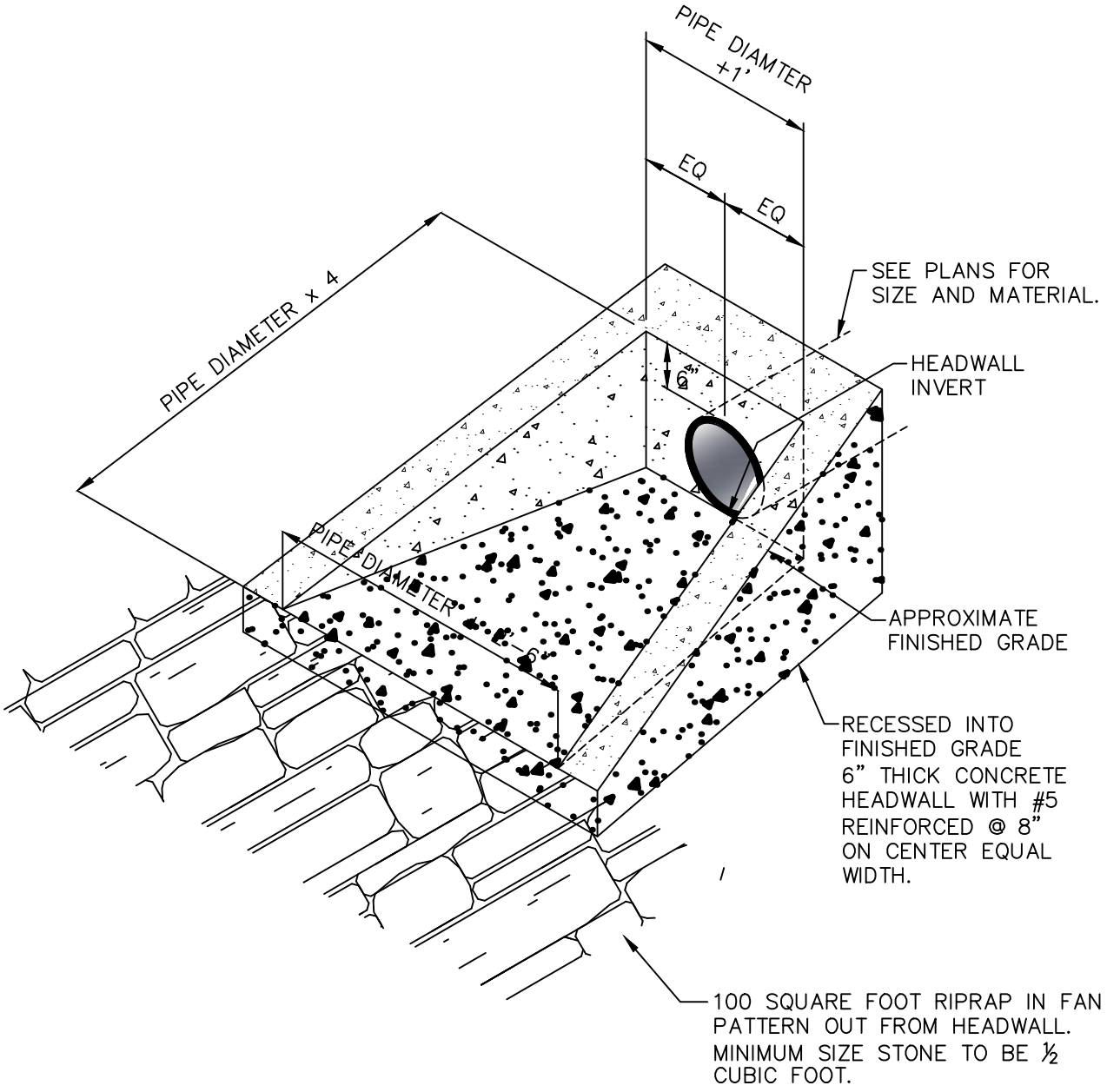
CITY OF Westfield INDIANA

NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

CITY OF WESTFIELD, INDIANA

4/1/14
DATE

FIGURE ST–4



ISOMETRIC @ HEADWALL TYPE "I"

CITY OF Westfield INDIANA

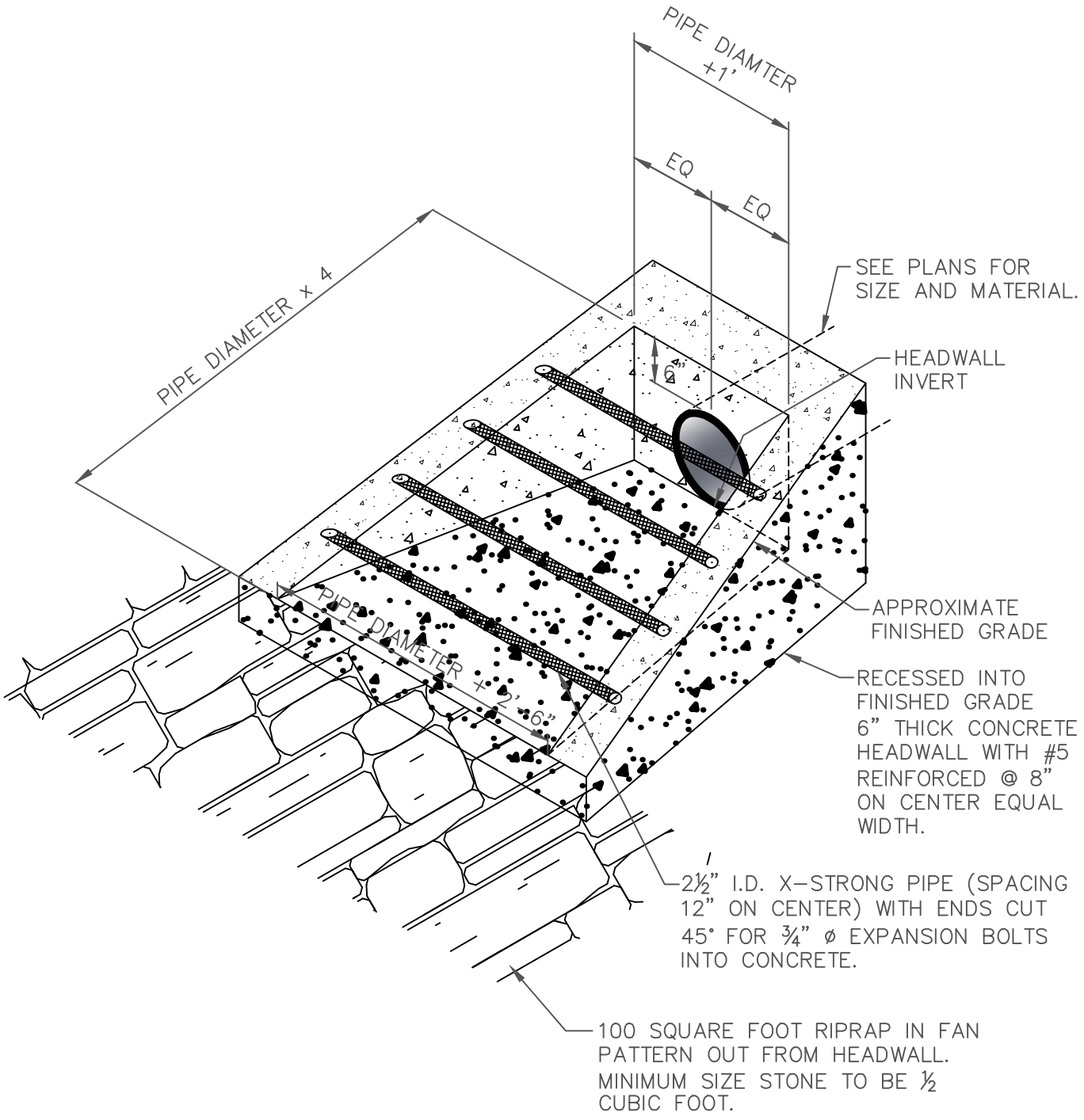
NEIL B. VANTREES REGISTERED NO. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

CITY OF WESTFIELD, INDIANA

Neil B. VanTrees

4/1/14
DATE

FIGURE ST–5



NOTE: HEADWALL SIMILAR TO TYPE "I" EXCEPT FOR PIPE GUARDS

ISOMETRIC @ HEADWALL TYPE "II"

CITY OF Westfield INDIANA

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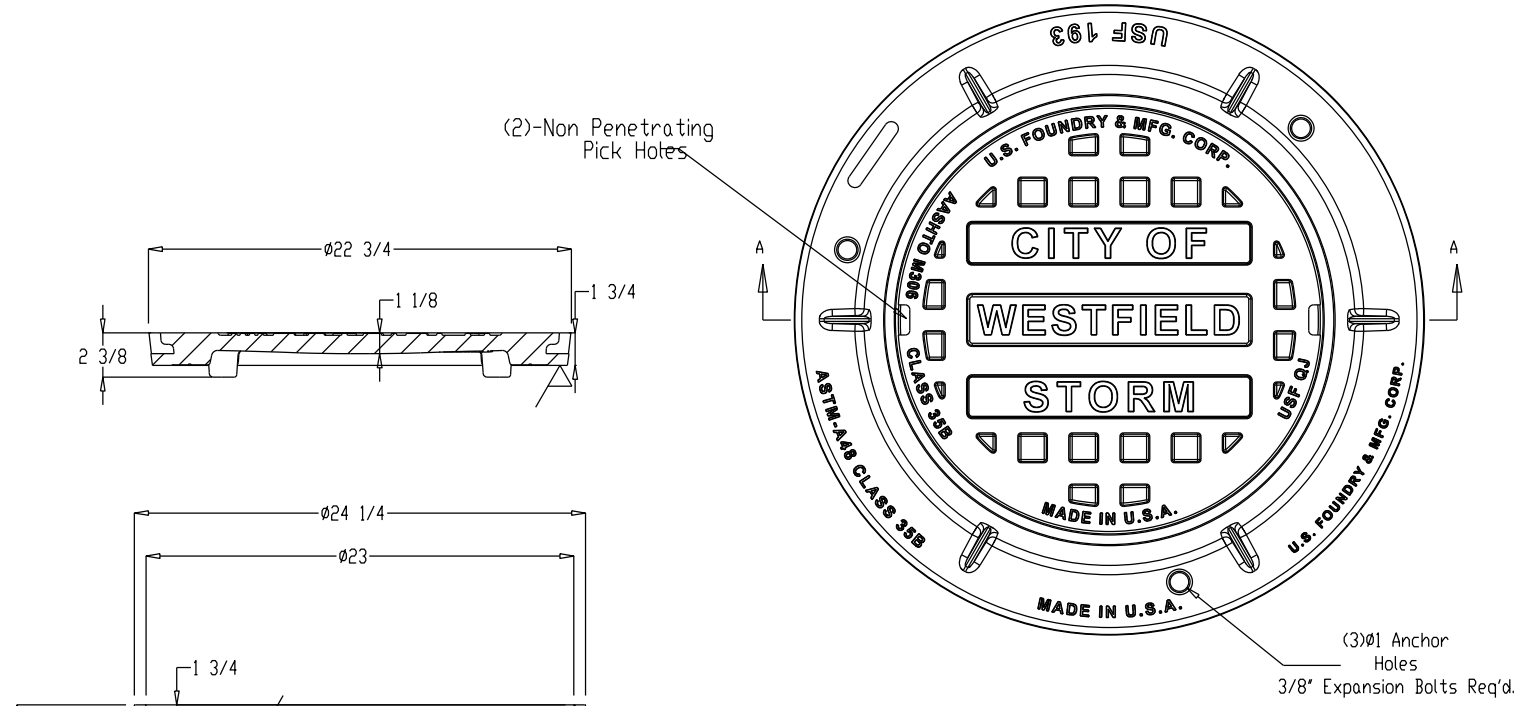
CITY OF WESTFIELD, INDIANA

4/1/14
DATE

FIGURE ST-6



NEENAH	R-1642
EAST JORDAN	1045Z
USF	755-NC

MANHOLE SOLID LID CASTING DETAIL

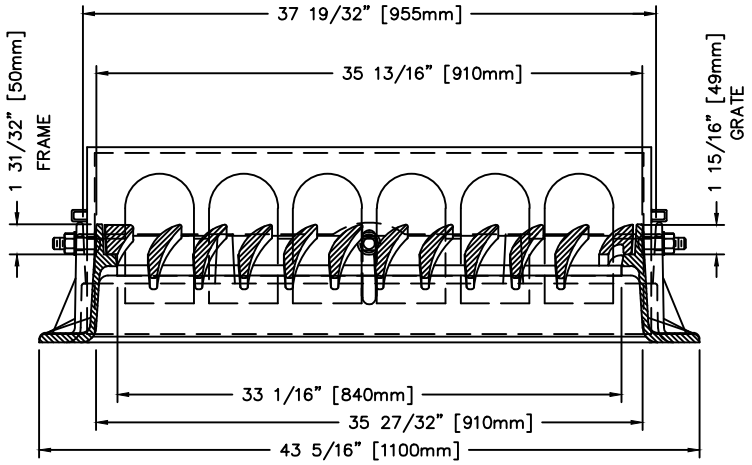
CITY OF Westfield INDIANA

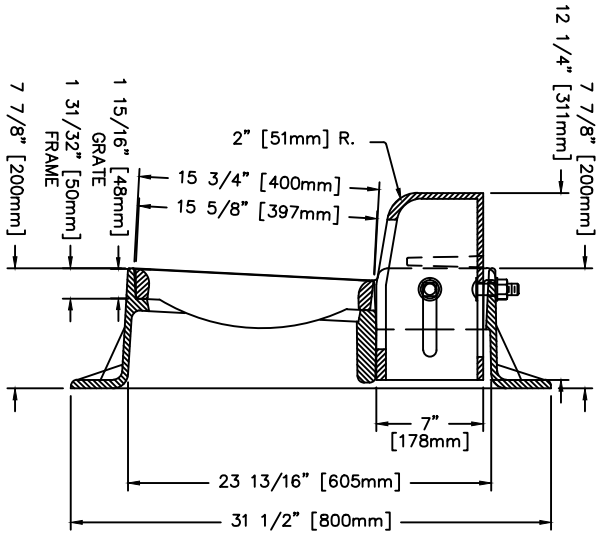
PHILLIP A. SUNDLING
REGISTERED
No.
11300022
STATE OF
INDIANA
PROFESSIONAL ENGINEER

2/26/16
DATE

CITY OF WESTFIELD
INDIANA

FIGURE ST-07





NEENAH	R-3287-10V
EAST JORDAN	7505 M1 & T2

* OR APROVED BY WESTFIELD PUBLIC WORKS DEPARTMENT

** STORM SEWER CASTINGS MANHOLE COVERS, BEEHIVE INLETS, CURB INLETS OR OTHER APPROVED CASTING SHALL HAVE THE FOLLOWING PHRASES CAST IN RECESSED LETTERS TWO (2) INCHES IN HEIGHT:

A. "STORM SEWER"
B. "DRAINS TO RIVER" OR "DRAINS TO WATERWAY"
C. "DUMP NO WASTE"
D. OTHER PHRASES SHALL REQUIRE APPROVAL OF THE WESTFIELD PUBLIC WORKS DEPARTMENT.

CHAIR BACK CURB INLET CASTING

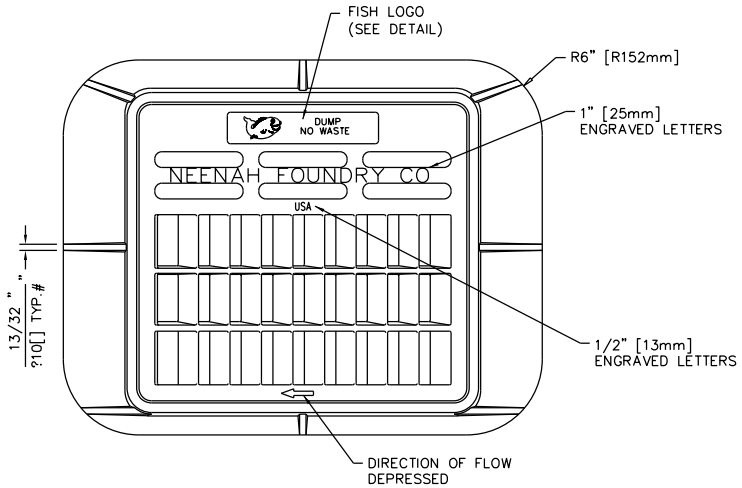
CITY OF Westfield INDIANA

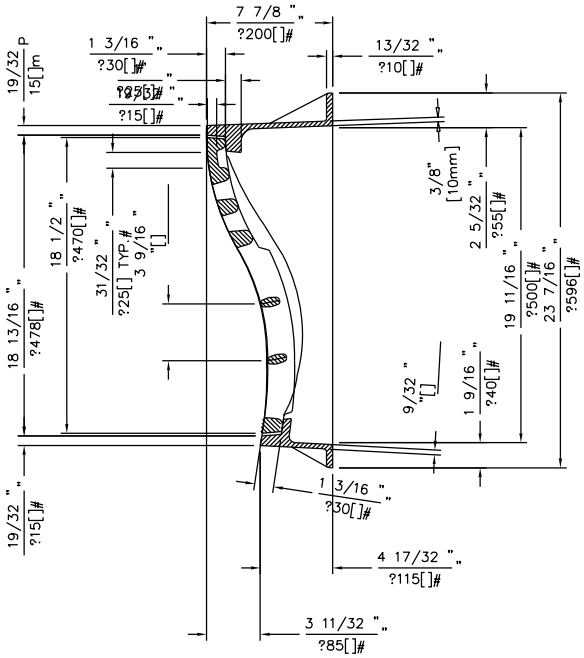
NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

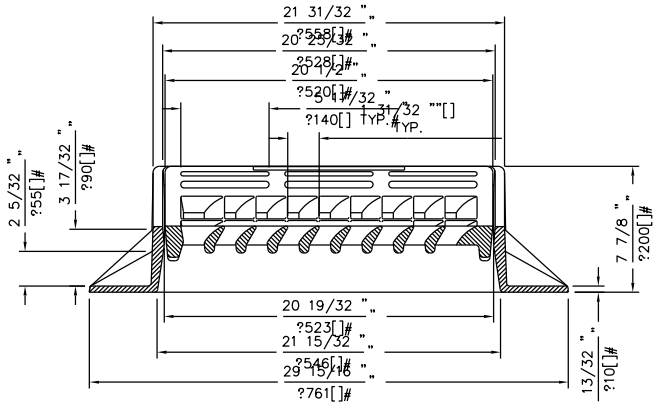
CITY OF WESTFIELD, INDIANA

4/1/13
DATE

FIGURE ST-8







NOTE: ALL DIMENSIONS SHOWN ARE IN ENGLISH AND [METRIC]
MEETS AASHTO M-306 PROOF LOAD REQUIREMENTS.
COMPONENT NOS: FRAME 3501-2176; GRATE 3501-3001
MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B
FINISH: NO PAINT
WEIGHT: FRAME 211#; GRATE 156#

NEENAH	3501-TL OR TR
EAST JORDAN	7495-M2 OR M1
USF	5254 & 6233 (L OR R)

** STORM SEWER CASTINGS MANHOLE COVERS, BEEHIVE INLETS, CURB INLETS OR OTHER APPROVED CASTING SHALL HAVE THE FOLLOWING PHRASES CAST IN RECESSED LETTERS:

A. "STORM SEWER"
B. "DRAINS TO RIVER" OR "DRAINS TO WATERWAY"
C. "DUMP NO WASTE"
D. OTHER PHRASES SHALL REQUIRE APPROVAL OF THE WESTFIELD PUBLIC WORKS DEPARTMENT.

ROLLED CURB INLET CASTING

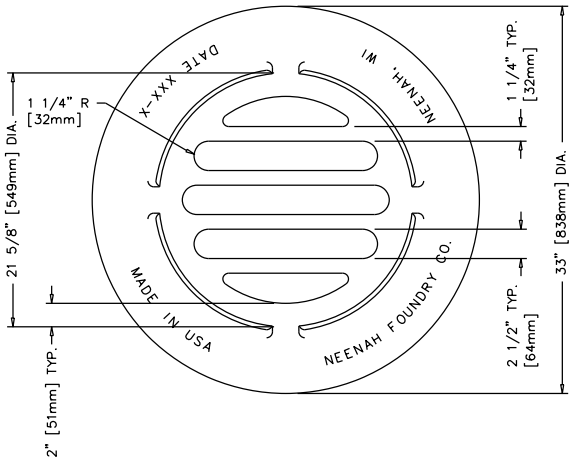
CITY OF Westfield INDIANA

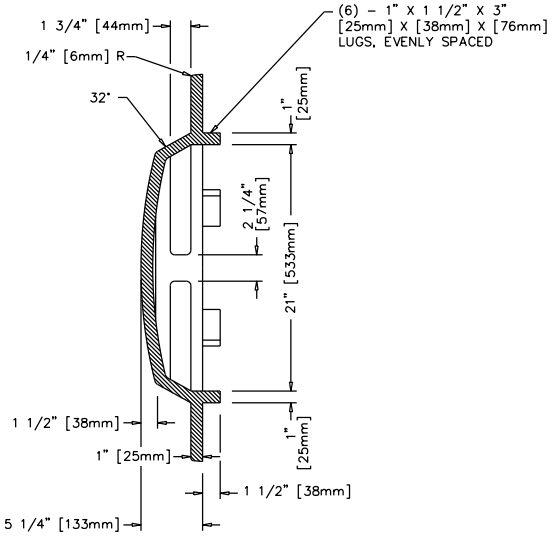
PHILLIP A. SUNDLING
REGISTERED
No.
11300022
STATE OF
INDIANA
PROFESSIONAL ENGINEER

2/26/16
DATE

CITY OF WESTFIELD
INDIANA

FIGURE ST-09





NEENAH	R-4342
EAST JORDAN	6489
USF	5695

* OR APROVED BY WESTFIELD PUBLIC WORKS DEPARTMENT

** STORM SEWER CASTINGS MANHOLE COVERS, BEEHIVE INLETS, CURB INLETS OR OTHER APPROVED CASTING SHALL HAVE THE FOLLOWING PHRASES CAST IN RECESSED LETTERS TWO (2) INCHES IN HEIGHT:

A. "STORM SEWER"
B. "DRAINS TO RIVER" OR "DRAINS TO WATERWAY"
C. "DUMP NO WASTE"
D. OTHER PHRASES SHALL REQUIRE APPROVAL OF THE WESTFIELD PUBLIC WORKS DEPARTMENT.

NOTES:

FOR NEENAH R-4342:
FREE OPEN AREA = 278 SQ. IN.
WEIGHT = 196#

BEEHIVE INLET CASTING

CITY OF WESTFIELD, INDIANA

PHILLIP A. SUNDLING REGISTERED No. 11300022 STATE OF INDIANA PROFESSIONAL ENGINEER

2/26/16
DATE

FIGURE ST-10

STR. NO.	TC/RIM ELEV.	INV. IN	INV. OUT	DEPTH	STR. SIZE	STR. TYPE	CASTING TYPE	PIPE SIZE	DIRECTION OF PIPE IN/OUT	STORM BMP YES/NO

DEPTH = T/C - (INV + DIA + THICKNESS)

NOTE: TABLE TO BE LOCATED ON DEVELOPMENT PLAN.

STRUCTURE DATA TABLE

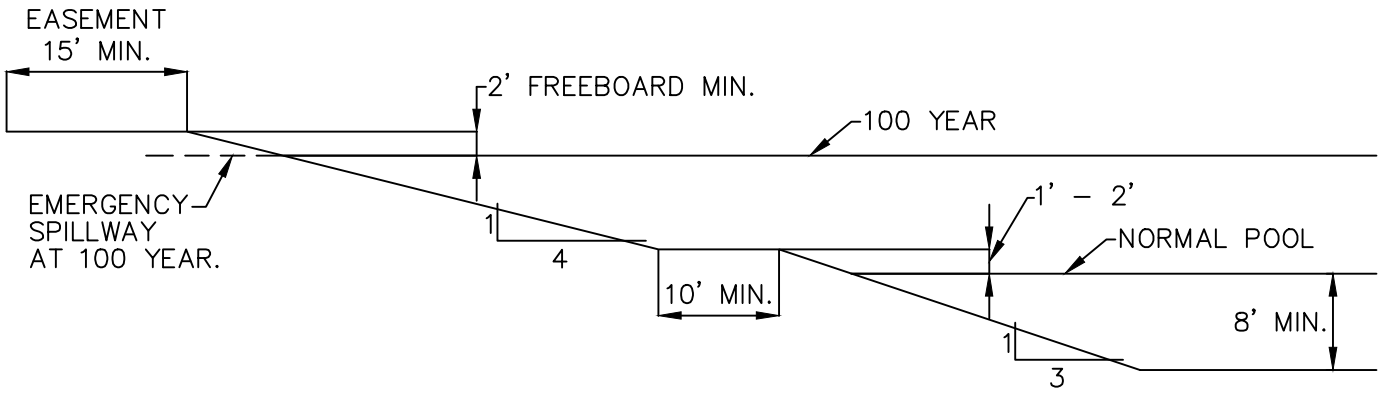
CITY OF Westfield INDIANA

NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

CITY OF WESTFIELD, INDIANA

4/1/13
DATE

FIGURE ST-16



USE OUTLET OPTION 1 (SEE FIGURE ST–26)

LAKE CROSS SECTIONS: OPTION 1

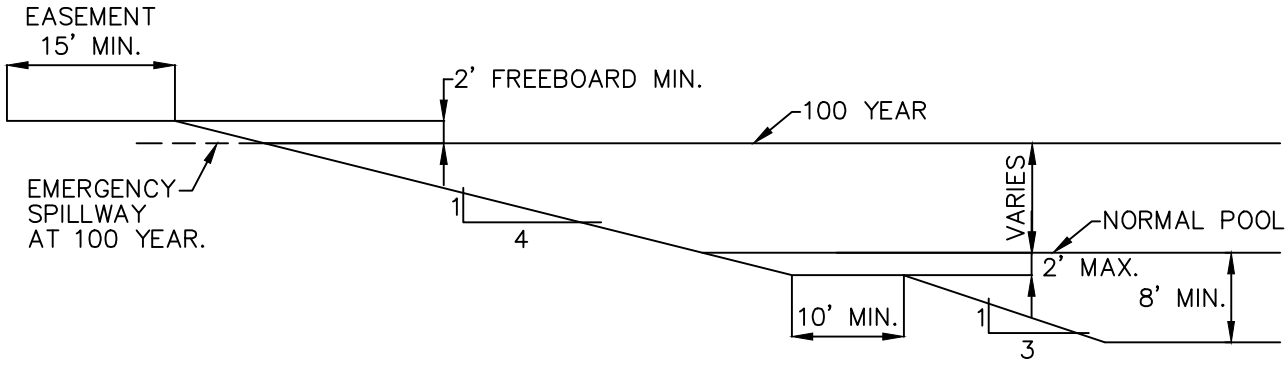
CITY OF Westfield INDIANA

NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

CITY OF WESTFIELD, INDIANA

4/1/13
DATE

FIGURE ST–23



USE OUTLET OPTION 2 (SEE FIGURE ST-27)

LAKE CROSS SECTIONS: OPTION 2

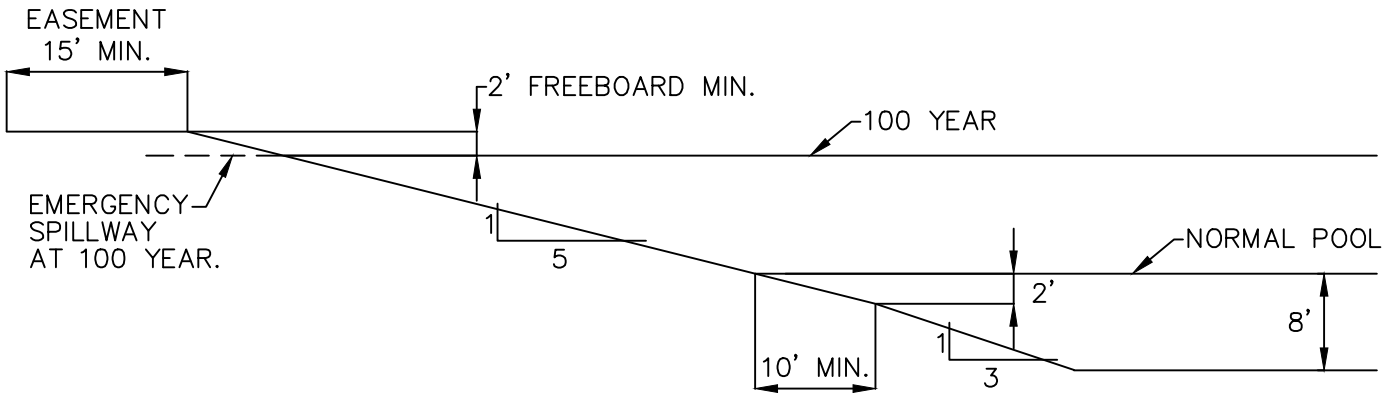
CITY OF Westfield INDIANA

NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

CITY OF WESTFIELD, INDIANA

4/1/13
DATE

FIGURE ST-24



USE OUTLET OPTION 3 (SEE FIGURE ST-28)

LAKE CROSS SECTIONS: OPTION 3

CITY OF Westfield INDIANA

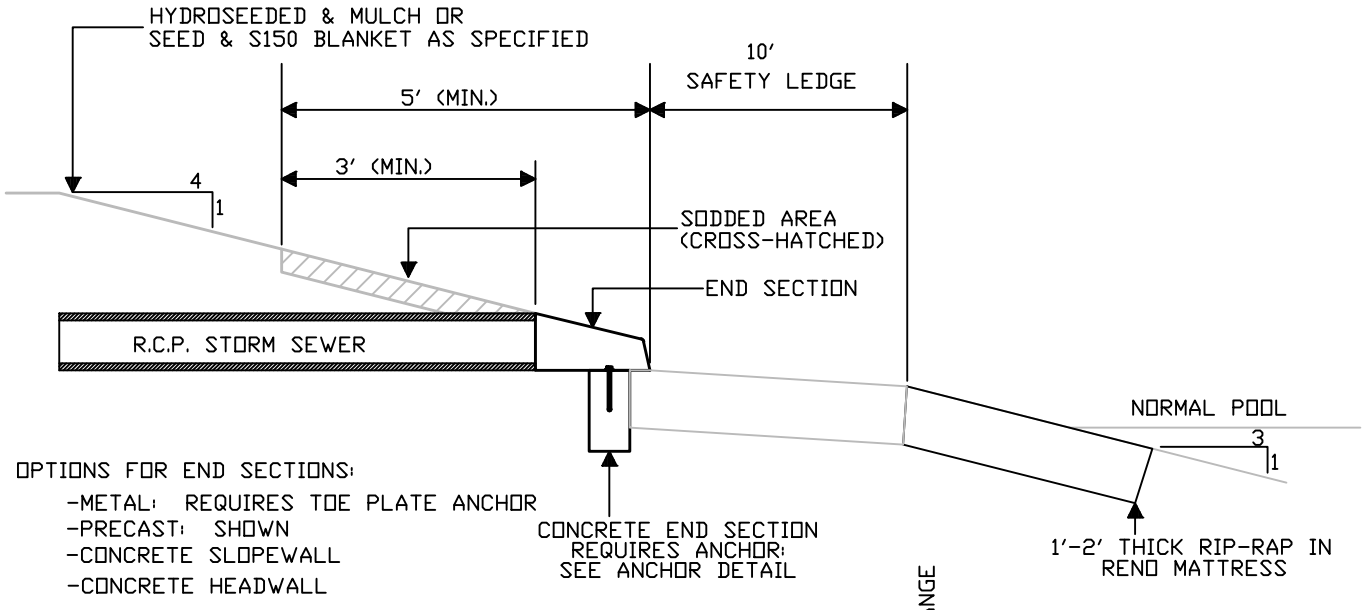
NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

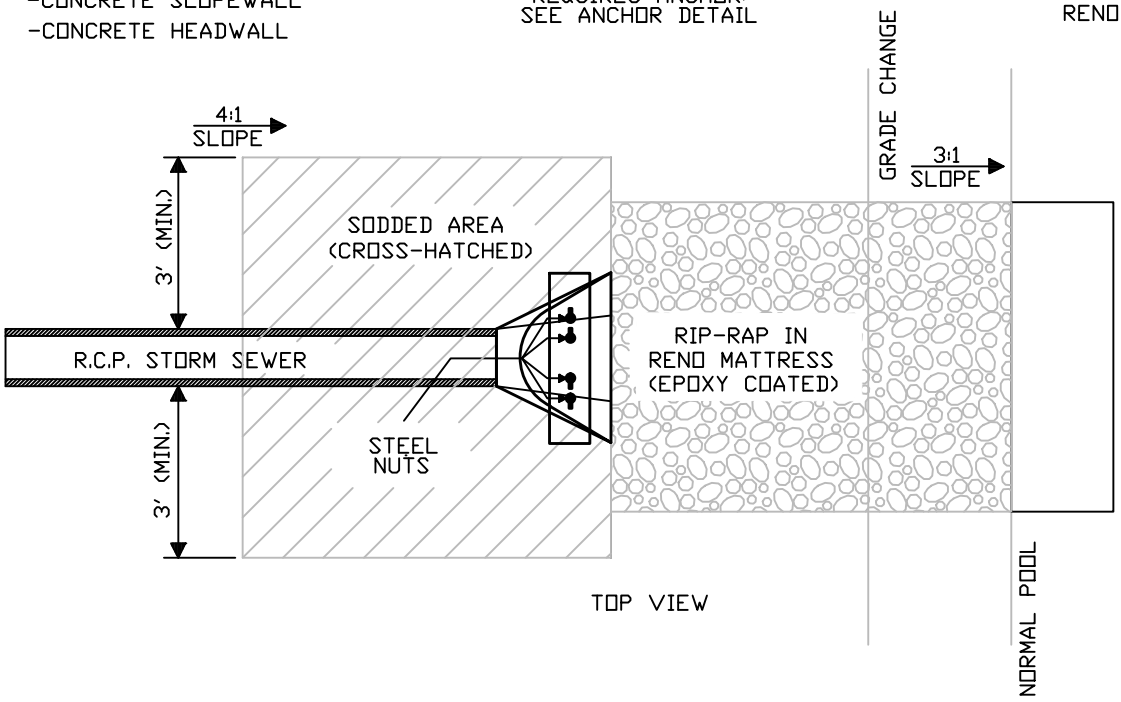
CITY OF WESTFIELD, INDIANA

4/1/13
DATE

FIGURE ST-25

UNDERWATER DISCHARGE NOT ALLOWED





LAKE OUTLET DETAIL
FOR LAKE CROSS-SECTION OPTION 1

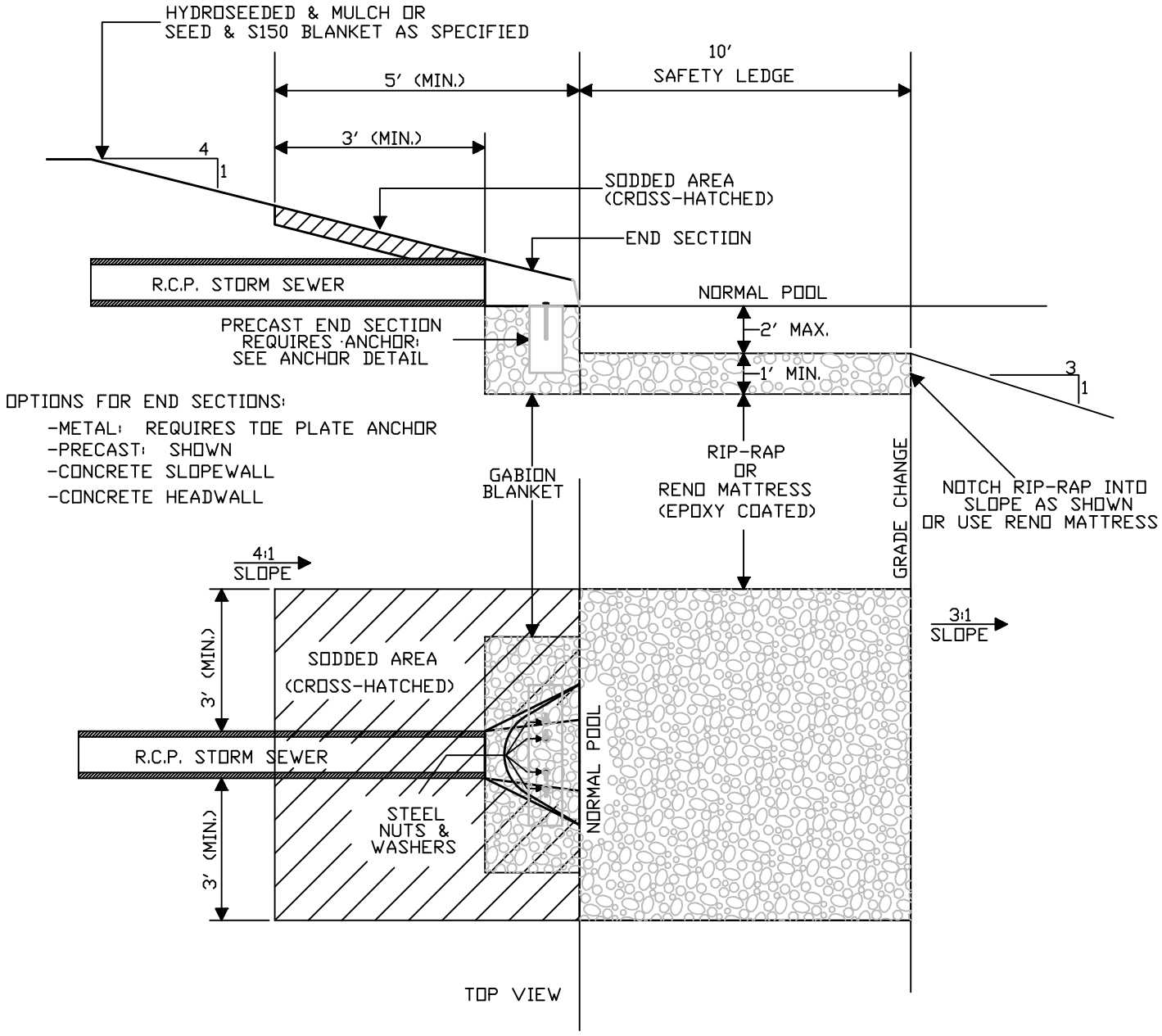
CITY OF Westfield INDIANA

NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

CITY OF WESTFIELD, INDIANA

4/1/13
DATE

FIGURE ST-26



LAKE OUTLET DETAIL
FOR LAKE CROSS-SECTION OPTION 2

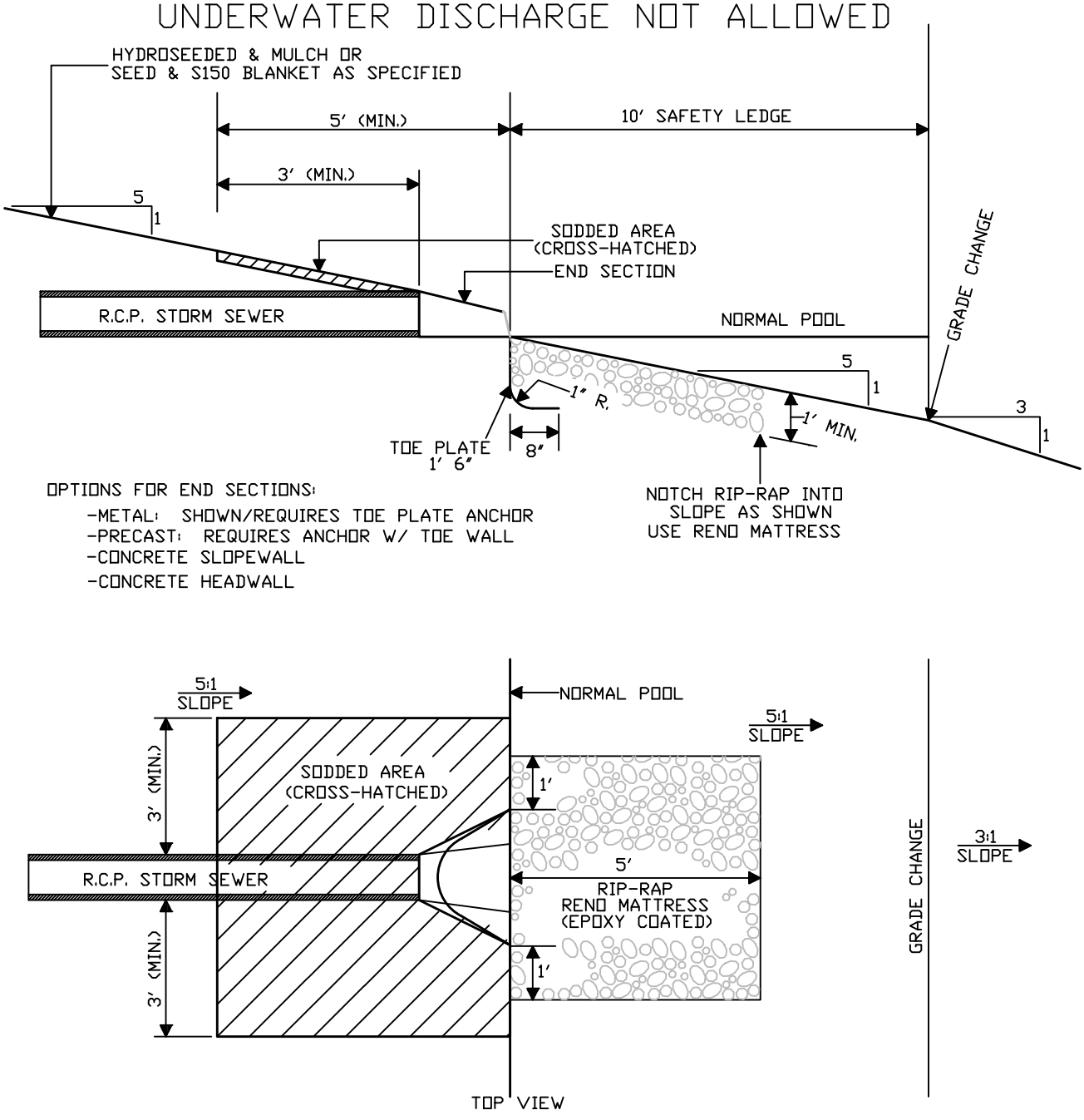
CITY OF Westfield INDIANA

NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

CITY OF WESTFIELD, INDIANA

Neil B. VanTrees 4/1/13
DATE

FIGURE ST-27



LAKE OUTLET DETAIL
FOR LAKE CROSS-SECTION OPTION 3

CITY OF Westfield INDIANA

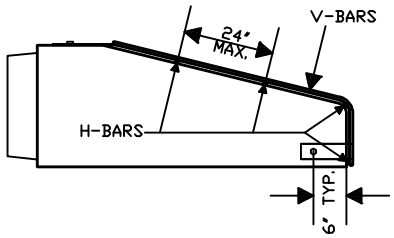
NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

CITY OF WESTFIELD, INDIANA

4/1/13
DATE

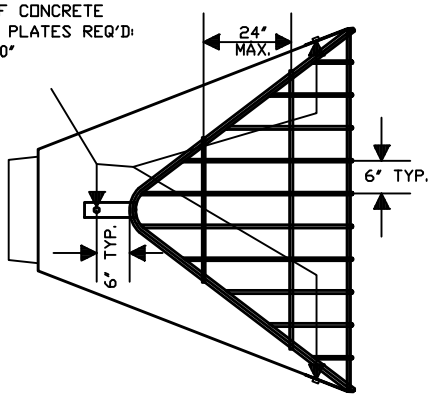
FIGURE ST-28

SIDE PROFILE



TOP VIEW

BOLT TO APRON 6" FROM EDGE OF CONCRETE
3 BOLT PLATES REQ'D:
¼"X4"X10"



	Apron Size Inches	V-bar Size Inches	No. of H-bars Req'd	H-bar Size Inches	Bolt Dia. Inches	"A" Dim. Inches
Arch pipe aprons	18	1/2	3	5/8	1/2	5
	24	5/8	4	3/4	1/2	7
	30	5/8	4	3/4	1/2	7 1/2
	36	3/4	4	1	1/2	10 1/2
	42	3/4	4	1	3/4	11
	48	3/4	4	1 ½ pipe	3/4	12
	54	3/4	4	1 ½ pipe	3/4	12
	60	3/4	5	1 ½ pipe	3/4	14
	72	3/4	5	1 ½ pipe	3/4	14
	84	3/4	6	1 ½ pipe	3/4	15
Round pipe aprons	12	1/2	3	5/8	1/2	4
	15	1/2	3	5/8	1/2	4 1/2
	18	1/2	4	5/8	1/2	4 1/2
	21	1/2	4	5/8	1/2	5
	24	5/8	4	3/4	1/2	5
	27	5/8	4	3/4	1/2	5 1/2
	30	5/8	4	3/4	1/2	5 1/2
	36	3/4	4	1	3/4	8
	42	3/4	4	1	3/4	8
	48	3/4	5	1	3/4	8
	54	3/4	5	1 ½ pipe	3/4	8
	60	3/4	5	1 ½ pipe	3/4	8
	66	3/4	6	1 ½ pipe	3/4	8
	72	3/4	6	1 ½ pipe	3/4	9
	84	3/4	7	1 ½ pipe	3/4	10
	90	3/4	7	1 ½ pipe	3/4	14

NOTES:
1. BARS & PLATES ARE HOT-ROLLED STEEL.
2. BARS, PLATES, & PIPIE ARE FINISHED WITH 2 COATS OF ALUMINUM PAINT.
3. BOLTS ARE GALVINIZED
4. NO REBAR THROUGH PIPES WILL BE ALLOWED
5. DEBRIS GUARD SHALL BE REMOVABLE

DEBRIS GUARD

CITY OF Westfield INDIANA

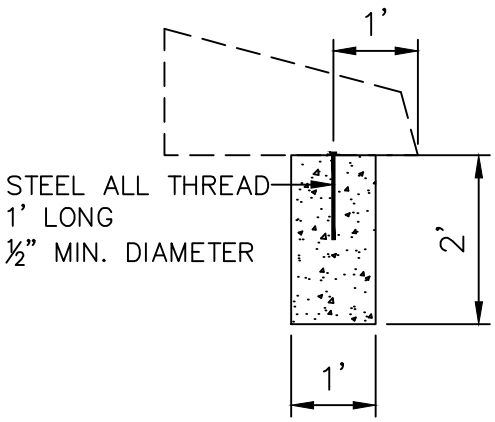
NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

CITY OF WESTFIELD, INDIANA

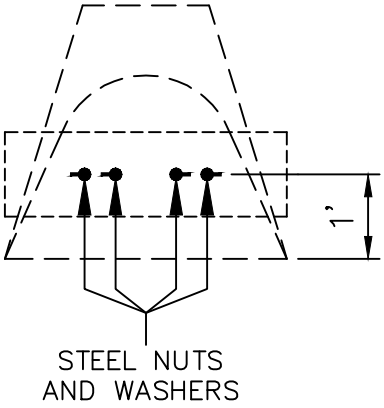
4/1/13
DATE

FIGURE ST-29

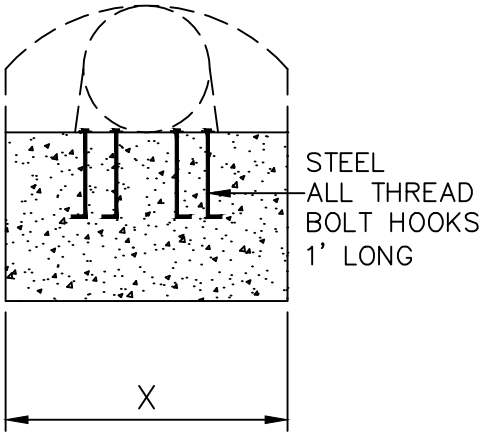
SIDE PROFILE



TOP VIEW



END PROFILE



X = WIDTH OF END SECTION

ALLTHREAD SPACING TO BE TWO PER FOOT
EX: 12" END SECTION = 2 ALLTHREAD
24" END SECTION = 4 ALLTHREAD

ANCHOR FOR CONCRETE END SECTIONS

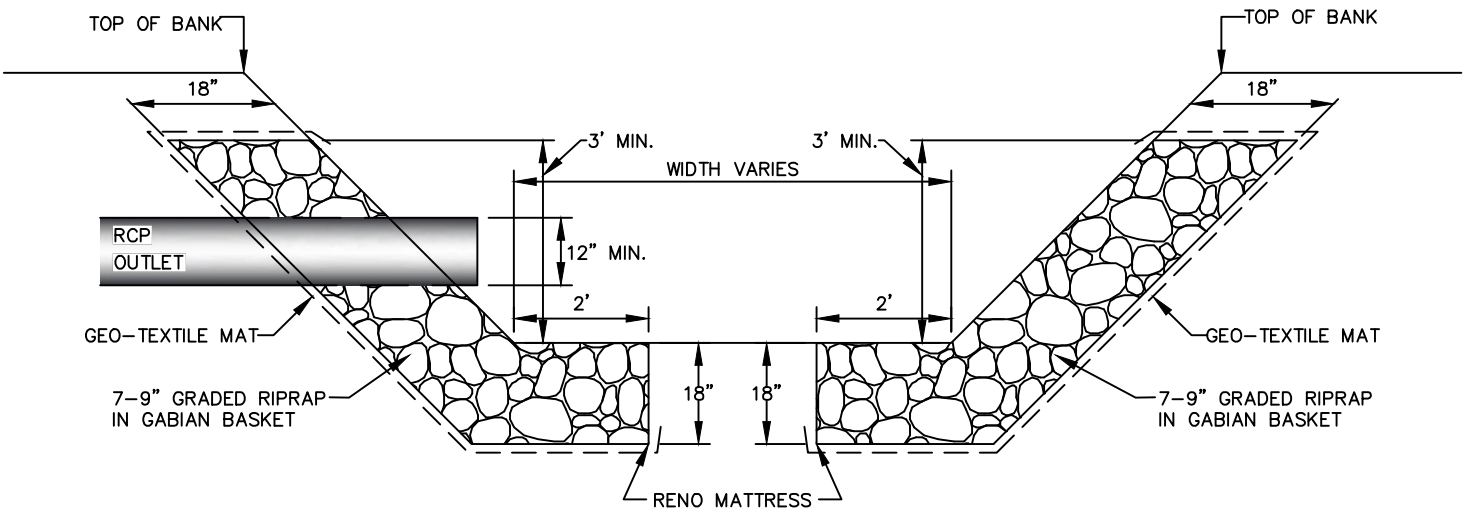
CITY OF Westfield INDIANA

NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

CITY OF WESTFIELD, INDIANA

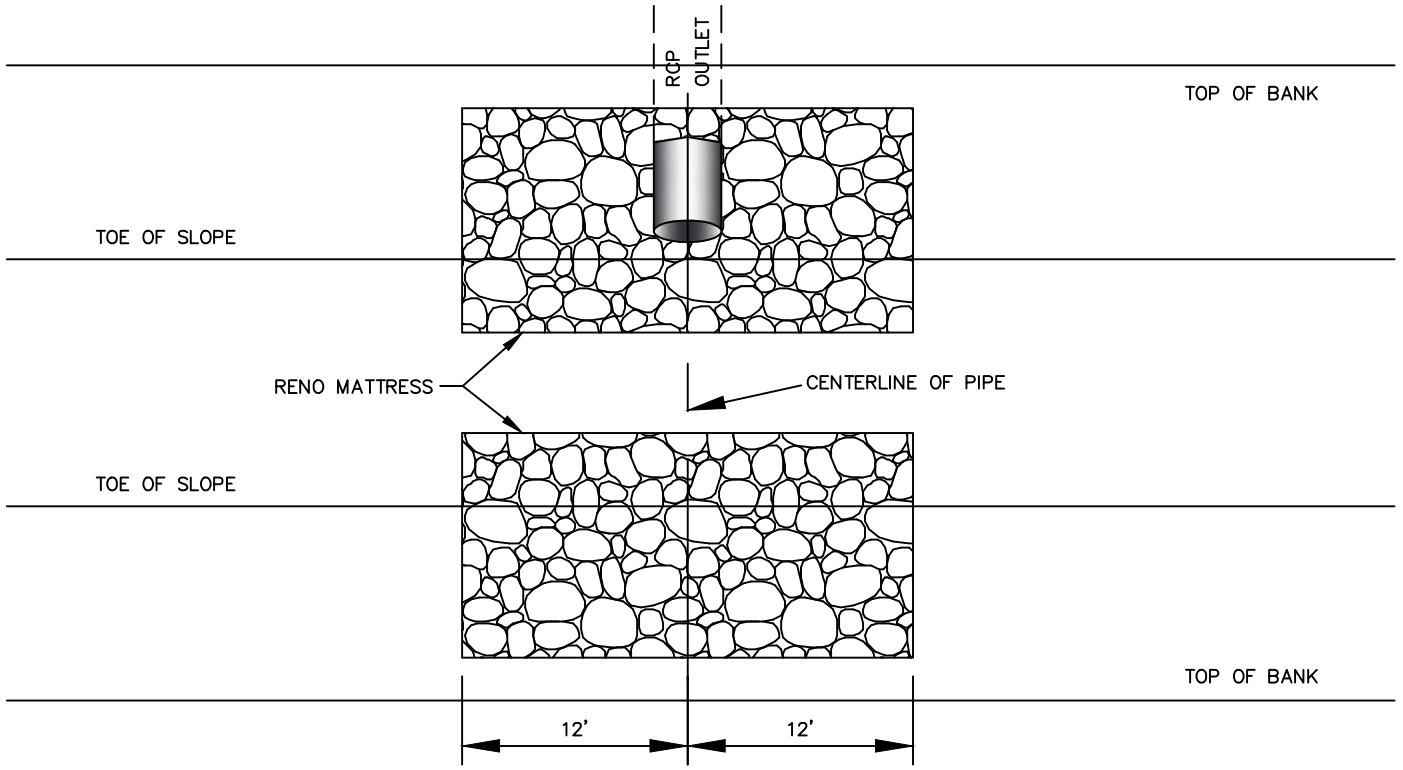
4/1/13
DATE

FIGURE ST-30



GEO-TEXTILE MAT SHALL EXTEND 6" ALL THE WAY AROUND THE PERIMETER OF THE RENO MATTRESS.

CROSS SECTION



PLAN VIEW

BANK ARMORMENT AT OUTLET PIPE IN OPEN CHANNELS

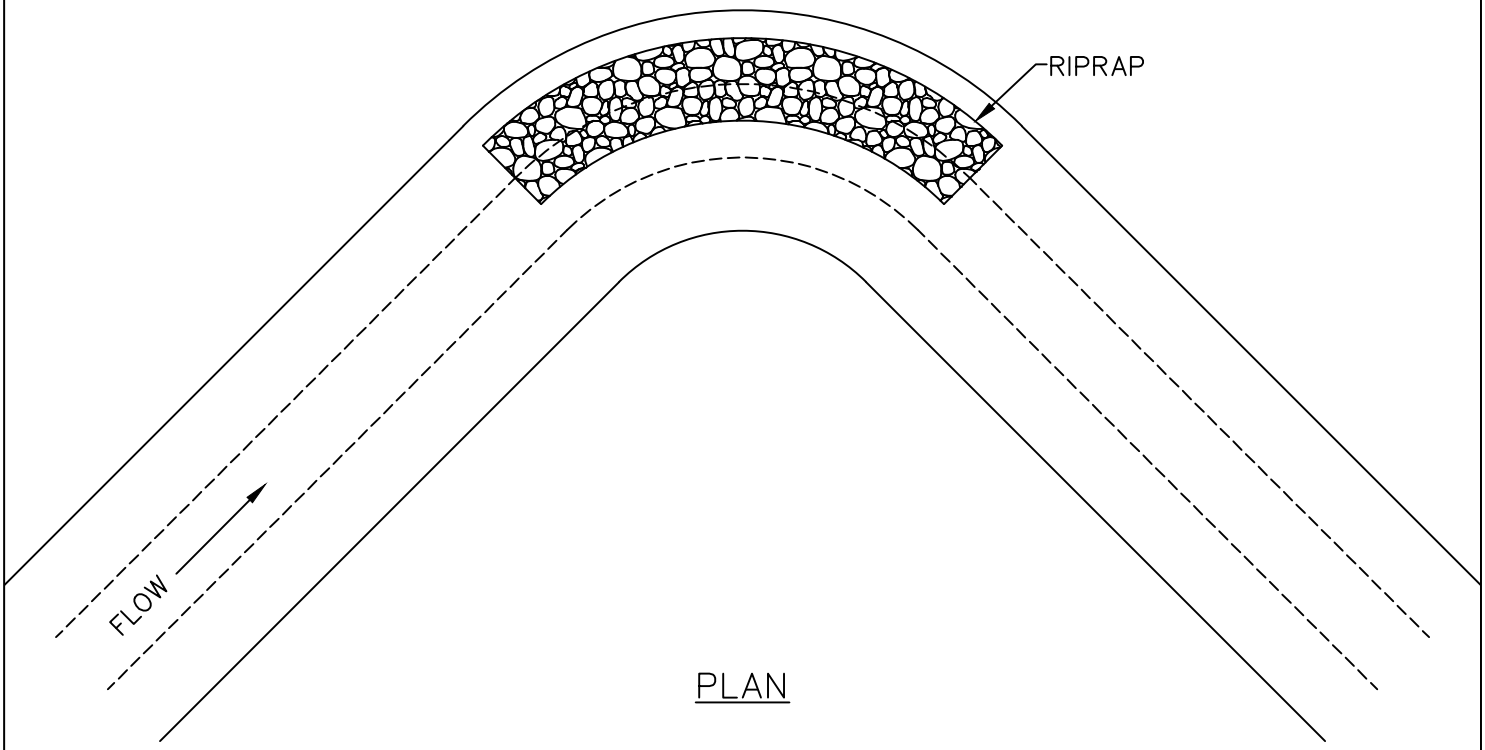
CITY OF Westfield INDIANA

NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

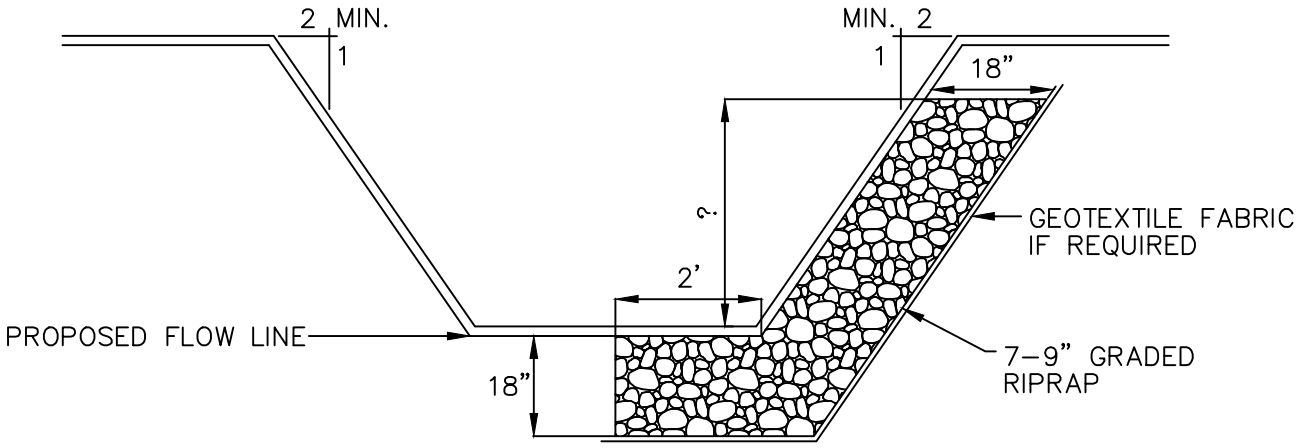
CITY OF WESTFIELD, INDIANA

4/1/13
DATE

FIGURE ST-31



PLAN



GEOTEXTILE FABRIC MAY BE REQUIRED, DEPENDING ON SOIL CONDITIONS.

CROSS SECTION

CORNER PROTECTION

CITY OF Westfield INDIANA

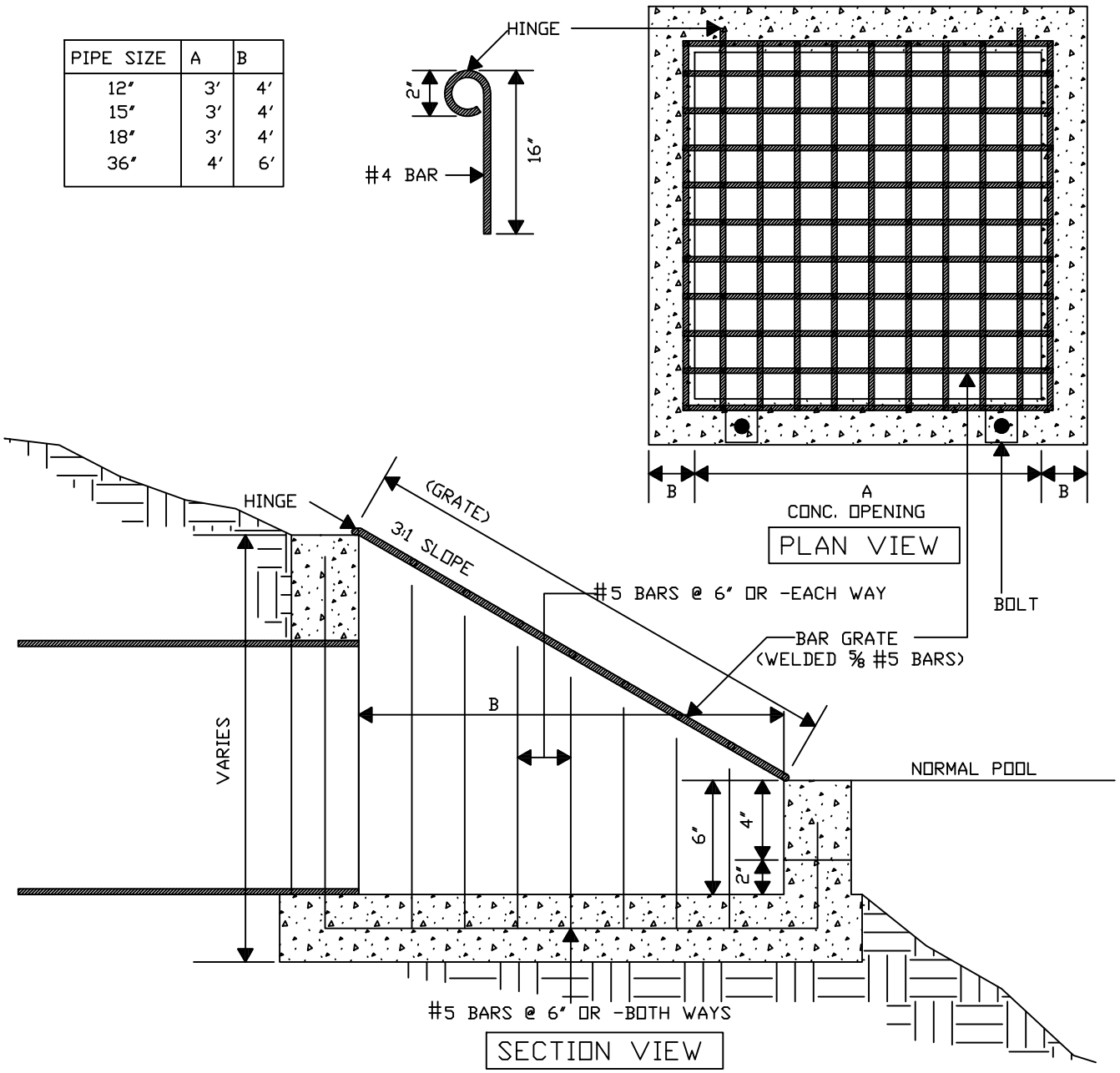
NEIL B. VANTREES REGISTERED No. 10809092 STATE OF INDIANA PROFESSIONAL ENGINEER

CITY OF WESTFIELD, INDIANA

4/1/13
DATE

FIGURE ST-32

PIPE SIZE	A	B
12″	3′	4′
15″	3′	4′
18″	3′	4′
36″	4′	6′



POND OUTFALL STRUCTURE

CITY OF WESTFIELD, INDIANA

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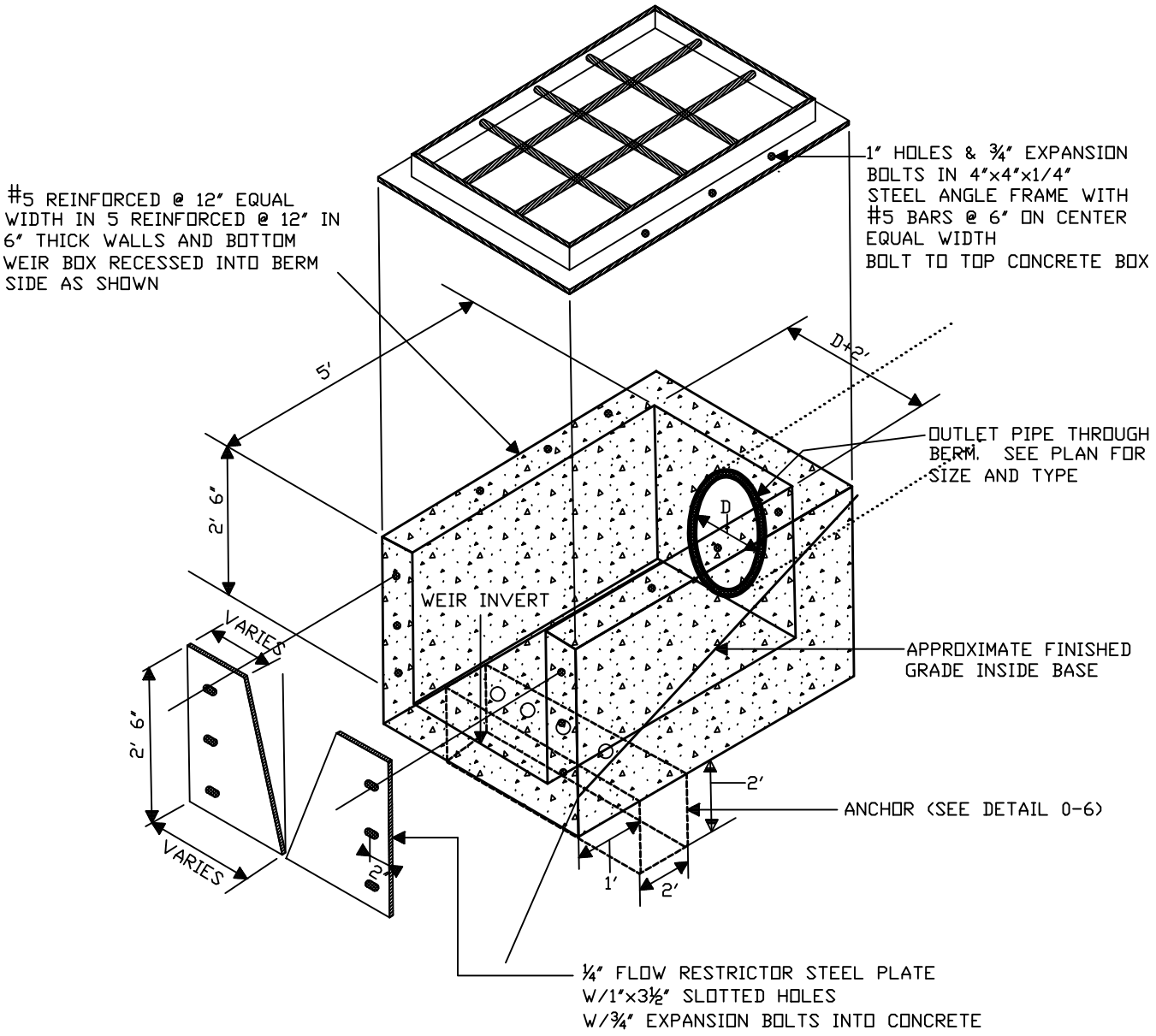
FIGURE ST-33



ISOMETRIC @ WEIR OUTLET

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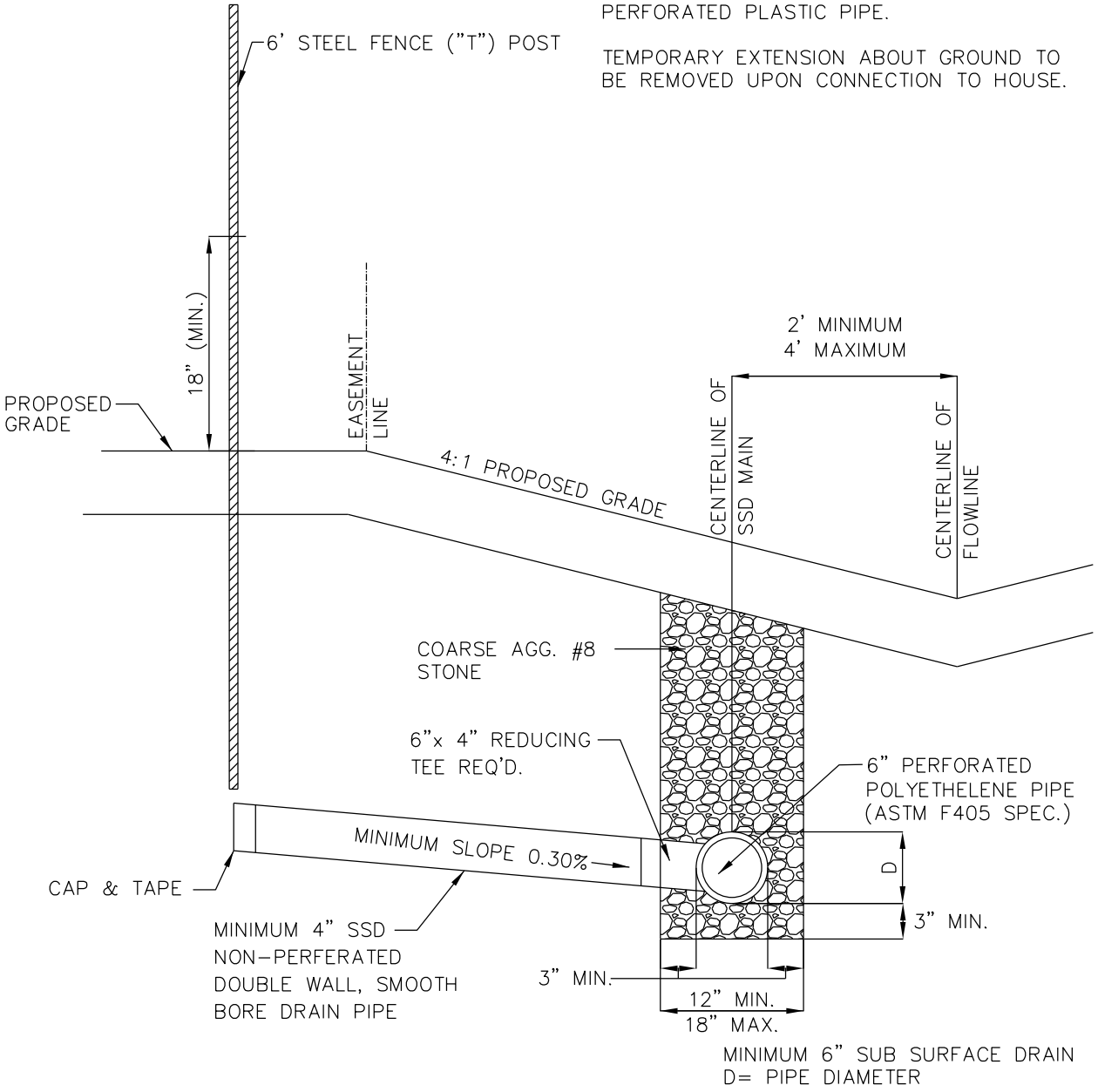
DATE

FIGURE ST-34

NOTES:

TILE SHALL BE DOUBLE WALL–SMOOTH WALL PERFORATED PLASTIC PIPE.

TEMPORARY EXTENSION ABOUT GROUND TO BE REMOVED UPON CONNECTION TO HOUSE.



TYPICAL SUBSURFACE DRAIN (SSD) LATERAL TO INDIVIDUAL LOTS IN REAR YARD SWALE

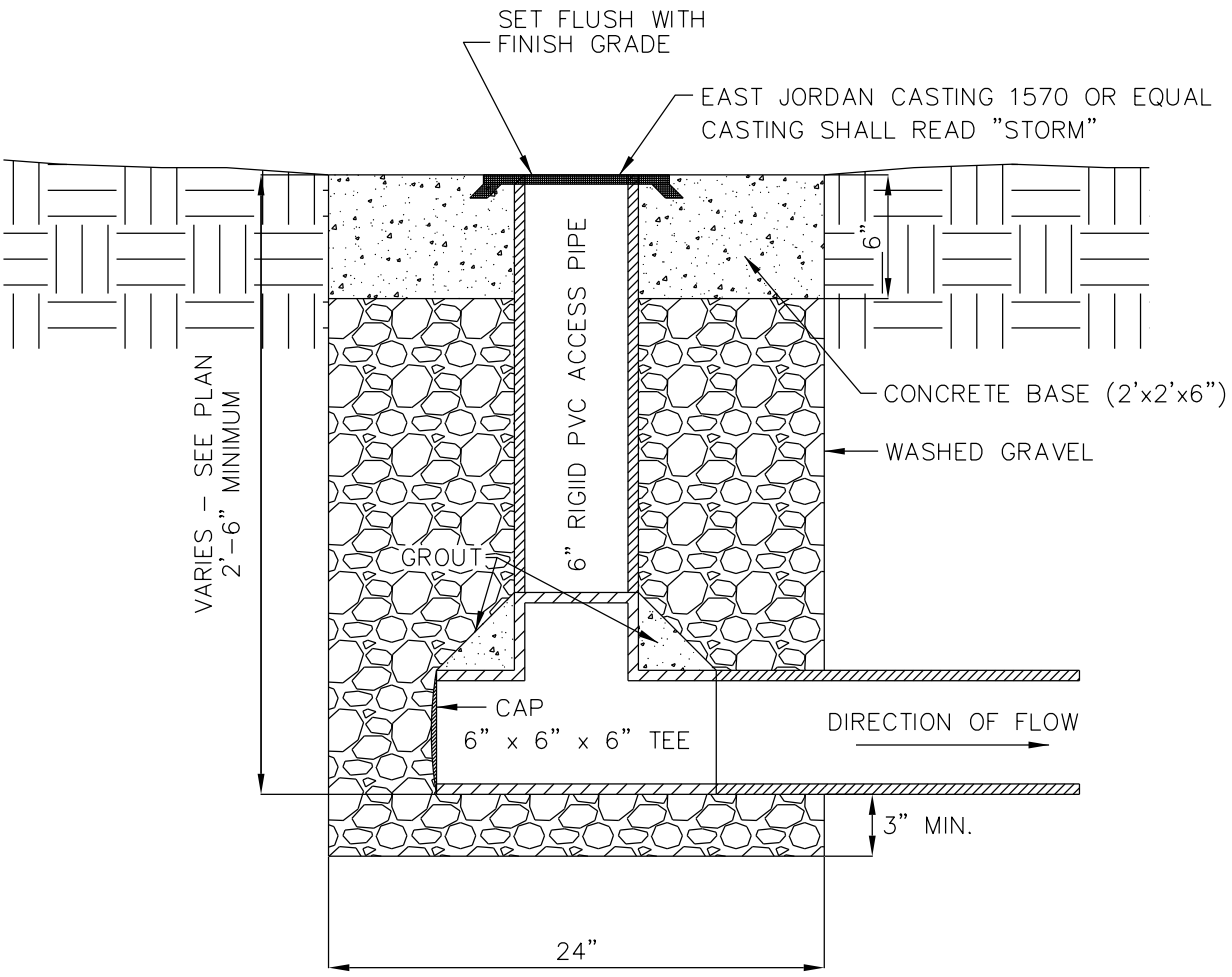
CITY OF WESTFIELD, INDIANA

CITY OF Westfield INDIANA

PHILLIP A. SUNDLING REGISTERED No. 11300022 STATE OF INDIANA PROFESSIONAL ENGINEER

2/26/16
DATE

FIGURE ST–36



NOTE: MINIMUM 6" SUB SURFACE DRAIN
D= PIPE DIAMETER

NOTE: TILE SHALL BE DOUBLE WALL SMOOTH WALL PERFORATED HDPE PIPE.

SUBSURFACE DRAIN (SSD) RISER DETAIL

CITY OF WESTFIELD, INDIANA

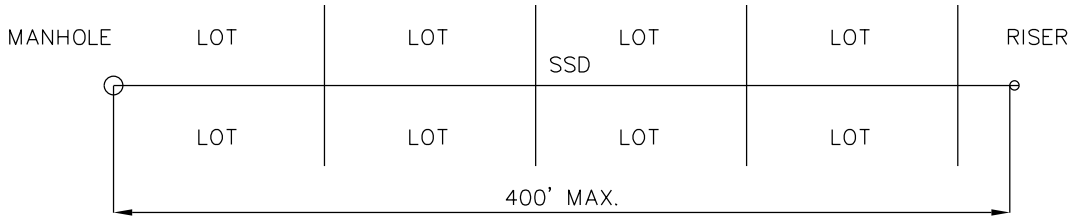
CITY OF Westfield INDIANA

PHILLIP A. SUNDLING
REGISTERED
No. 11300022
STATE OF INDIANA
PROFESSIONAL ENGINEER

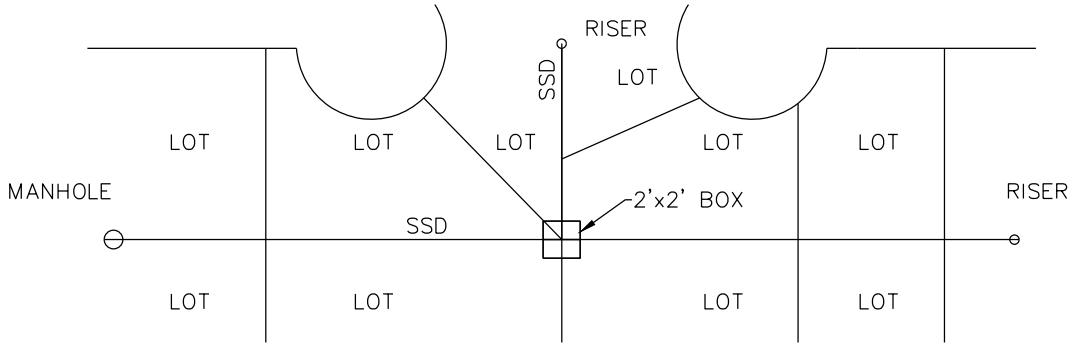
2/26/16
DATE

FIGURE ST–37

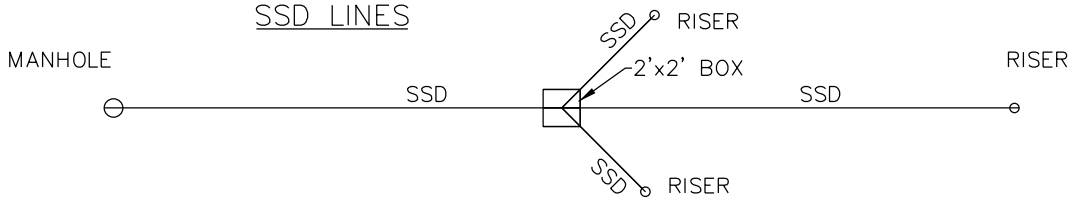
SINGLE LINE



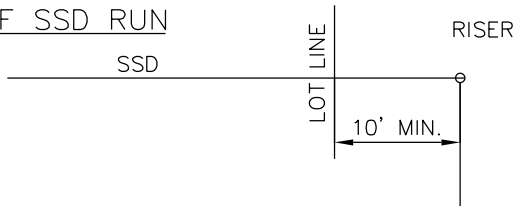
INTERSECTION OF TWO SSD LINES



INTERSECTION OF THREE OR MORE SSD LINES



END OF SSD RUN



RISER LOCATIONS

CITY OF Westfield INDIANA

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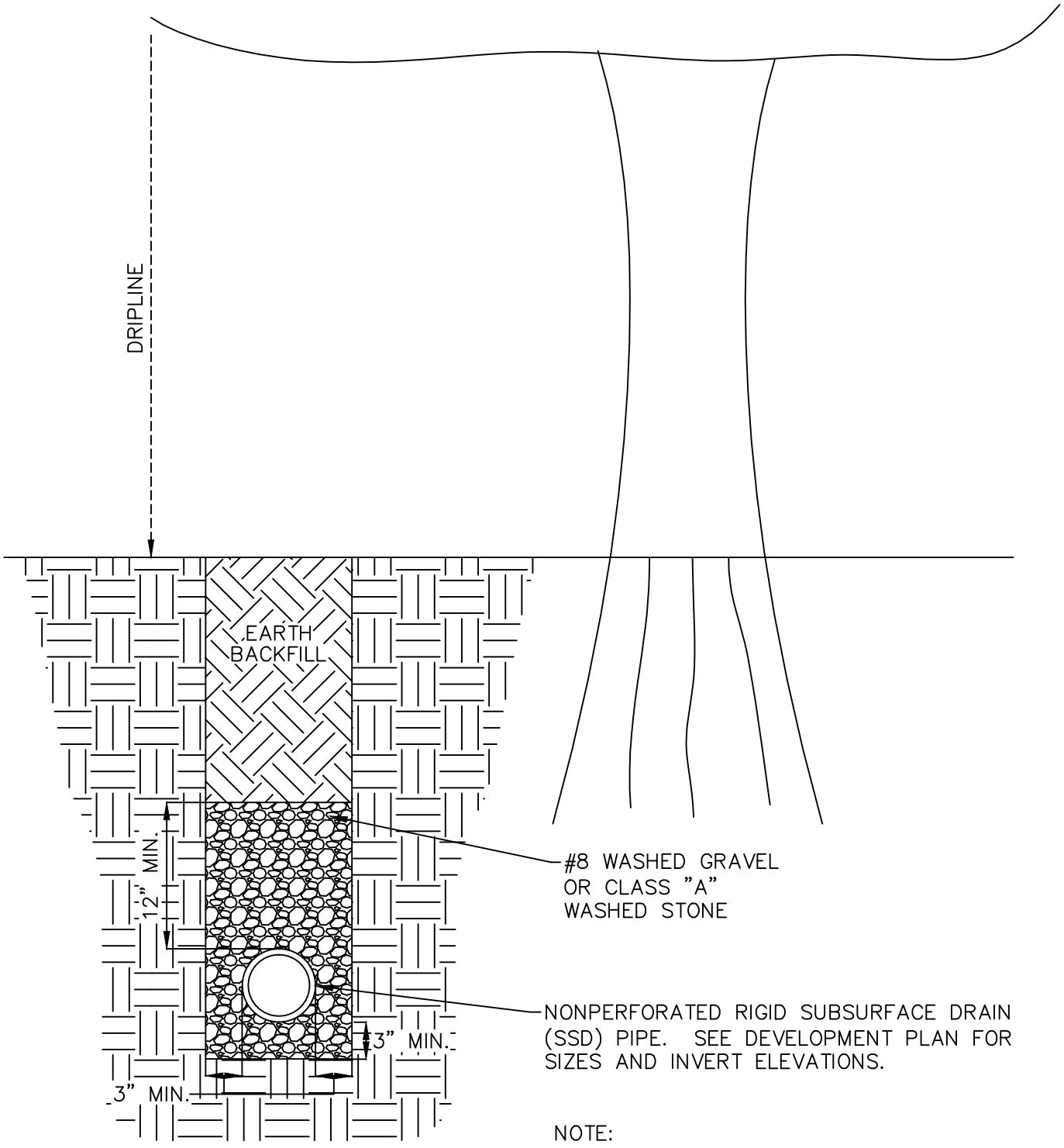
CITY OF WESTFIELD, INDIANA

2/26/16
DATE

FIGURE ST-38



NOTE:
TILE SHALL BE DOUBLE WALL, SMOOTH WALL NONPERFORATED PLASTIC OR HDPE PIPE.

SUBSURFACE DRAIN (SSD) DETAIL WHEN WITHIN DRIPLINE OF EXISTING TREES

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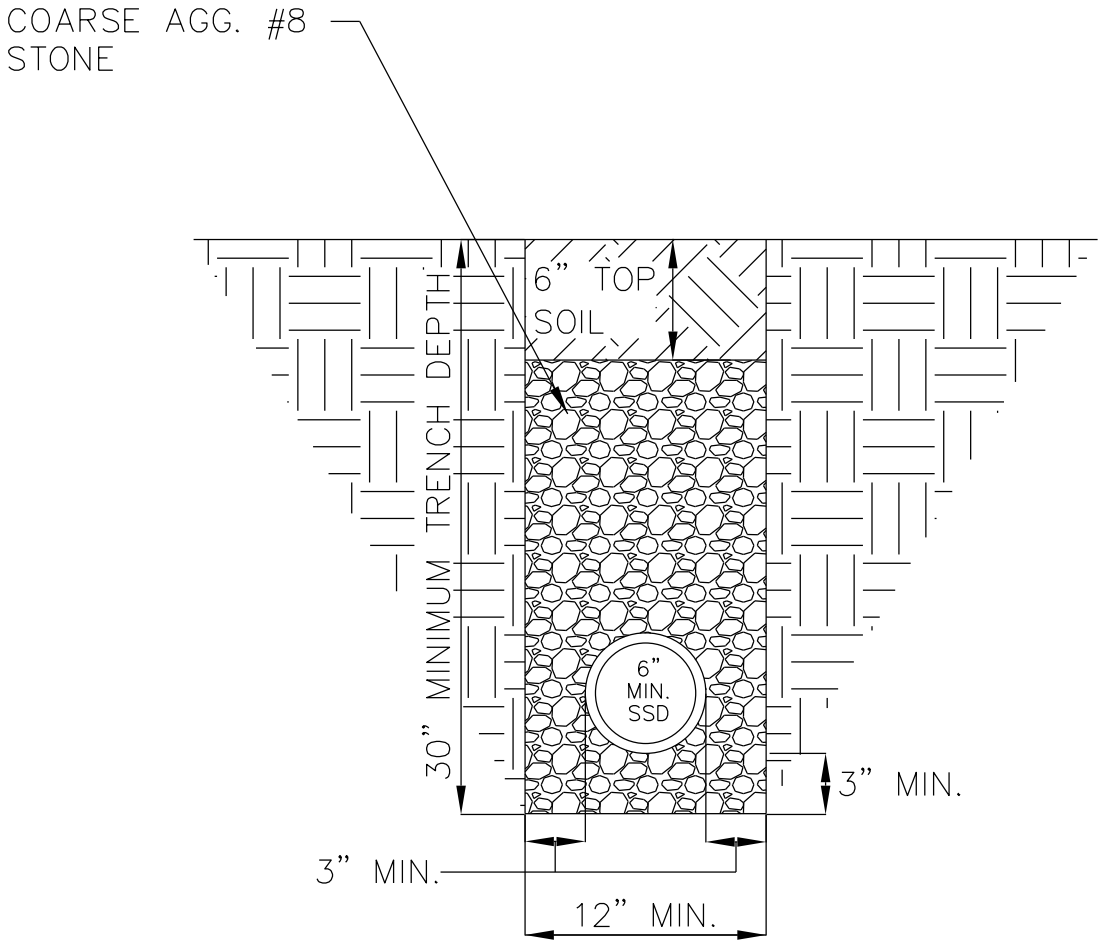
FIGURE ST-39



NOTE:
TILE SHALL BE DOUBLE WALL, SMOOTH WALL PERFORATED HDPE PIPE.

SUBSURFACE DRAIN (SSD) – NO SWALE

CITY OF WESTFIELD, INDIANA

CITY OF Westfield INDIANA

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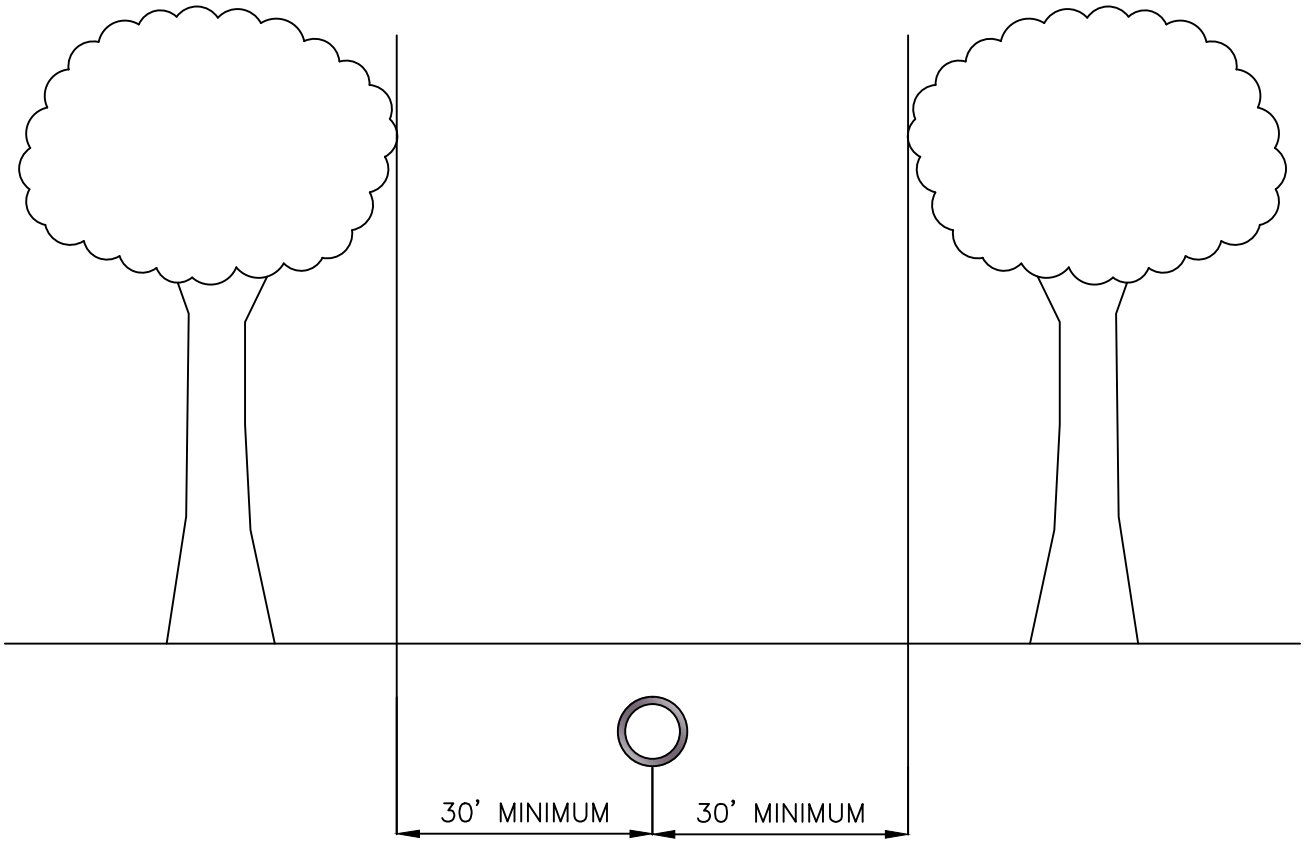
2/26/16
DATE

FIGURE ST-40



TILE CLEARING THROUGH WOODS

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CITY OF WESTFIELD, INDIANA

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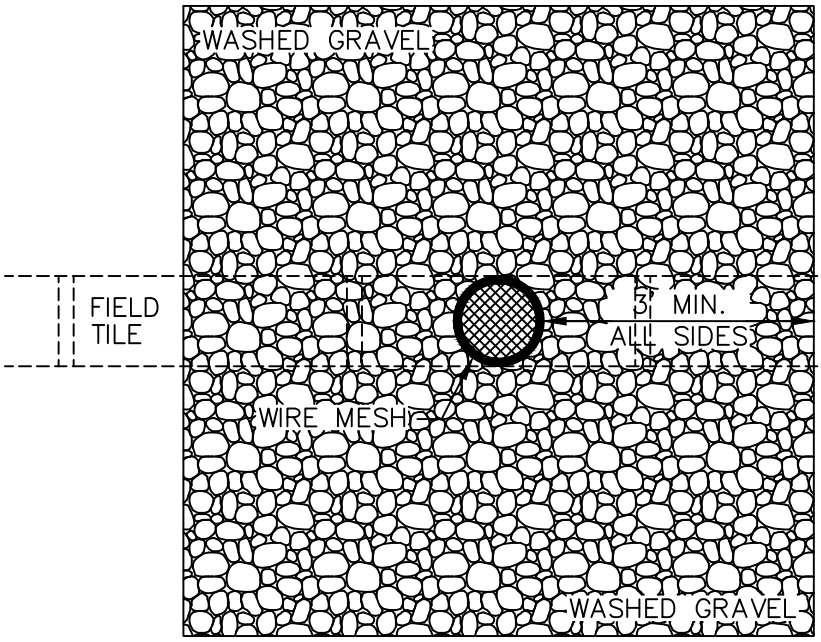
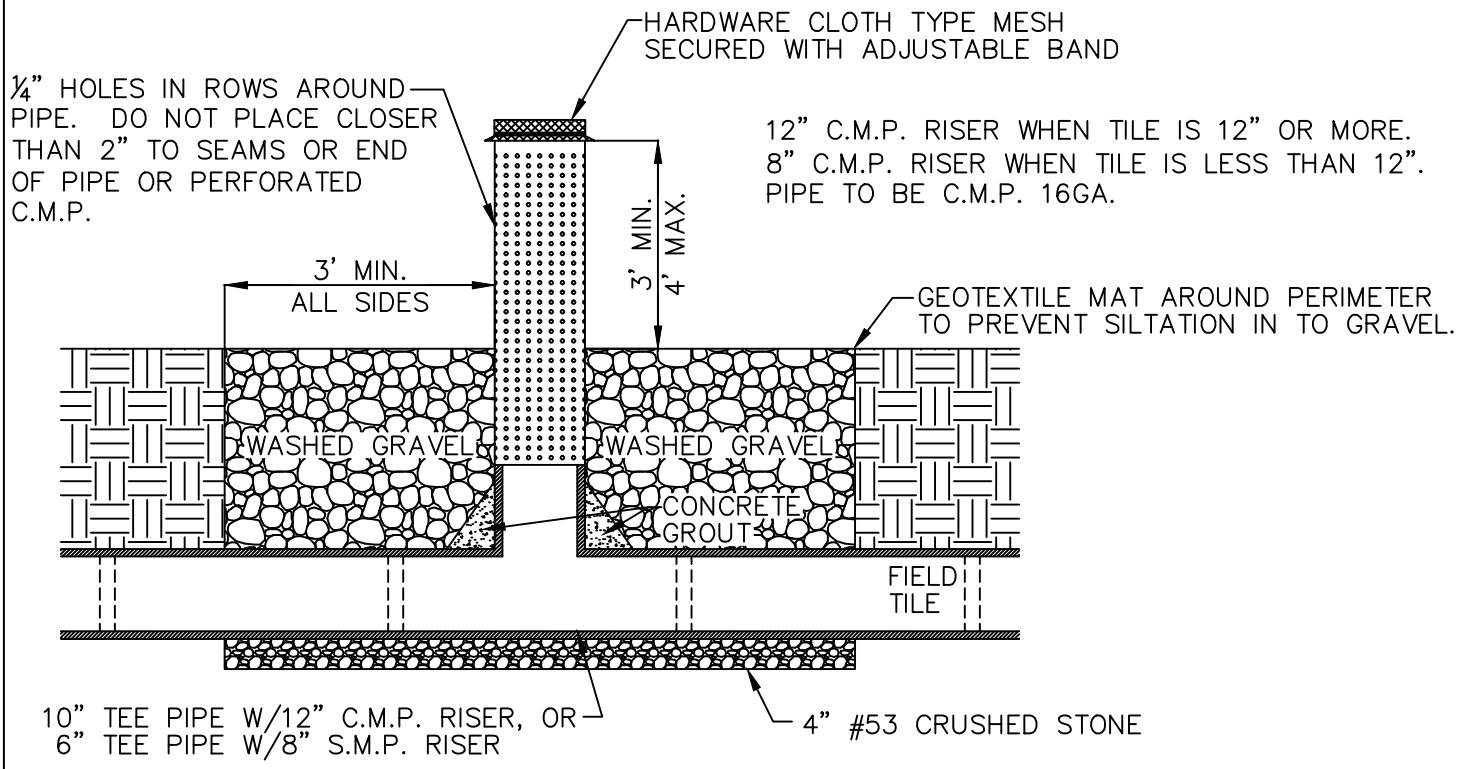
FIGURE ST-41



TOP VIEW



CROSS SECTION

SLOTTED RISER INLET DETAILS

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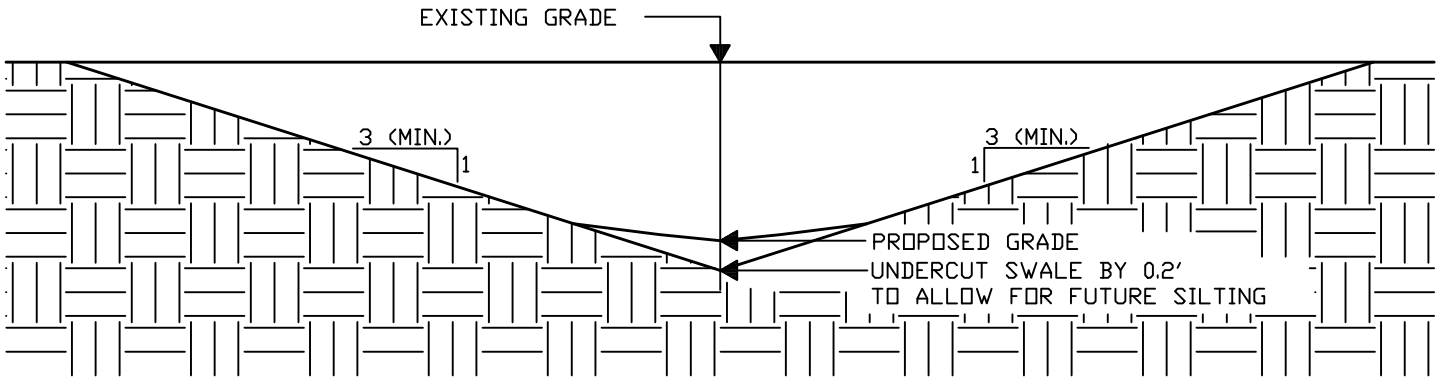
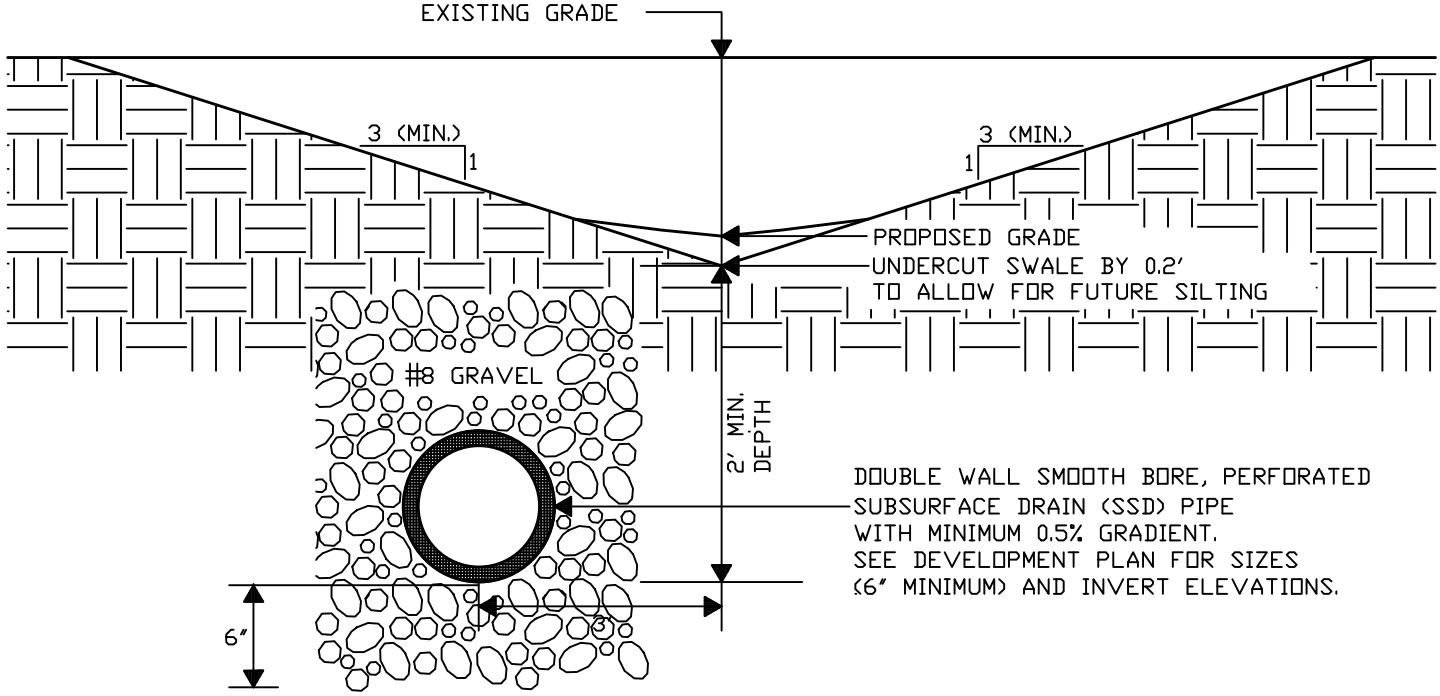
FIGURE ST-42



UNDERDRAINS REQUIRED IN SWALES WITH SLOPE BETWEEN 1% & 2% GRADIENT



MINIMUM CHANNEL SLOPE 1% GRADIENT

TYPICAL SWALE DETAIL

CITY OF Westfield INDIANA

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CITY OF WESTFIELD, INDIANA

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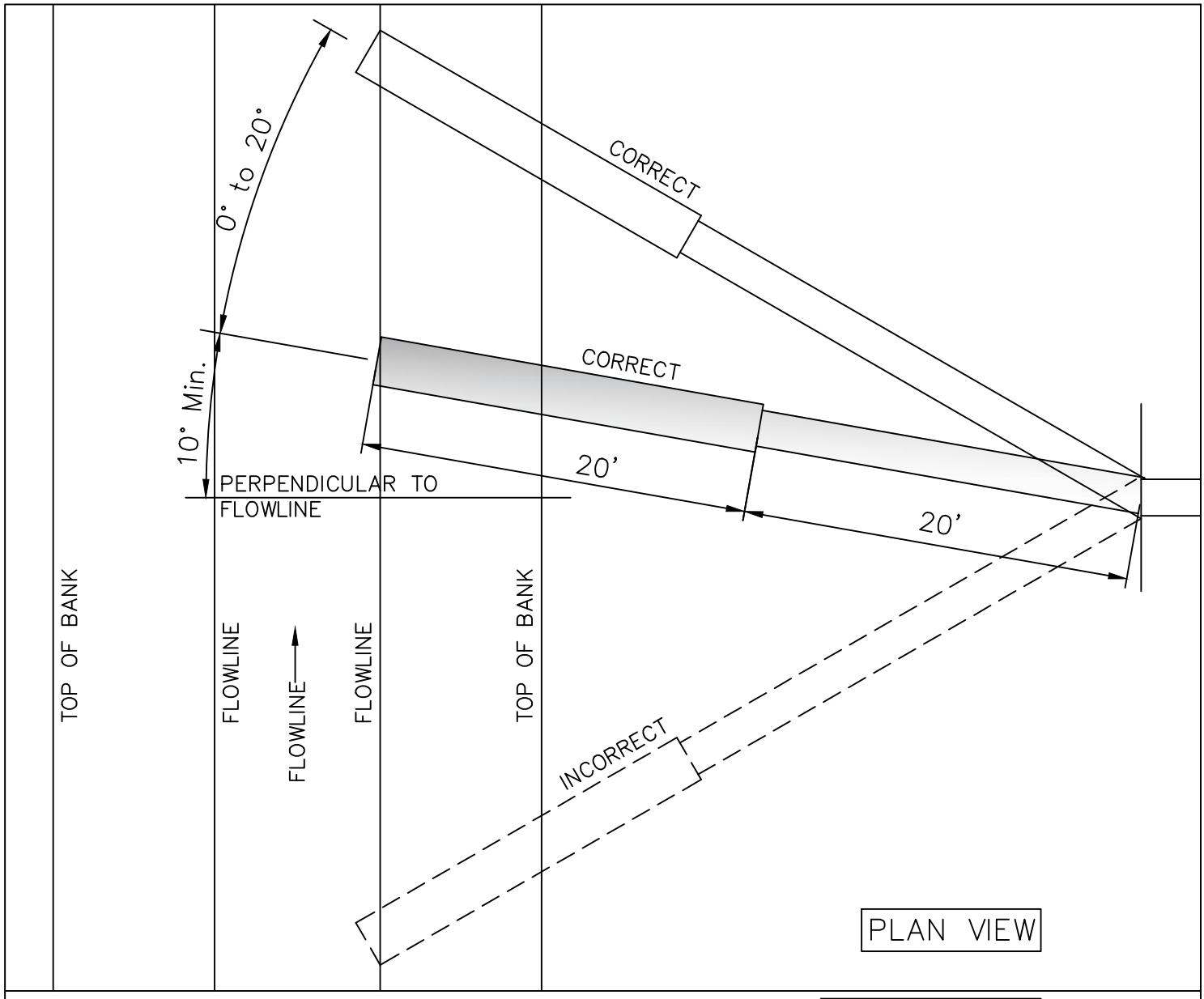
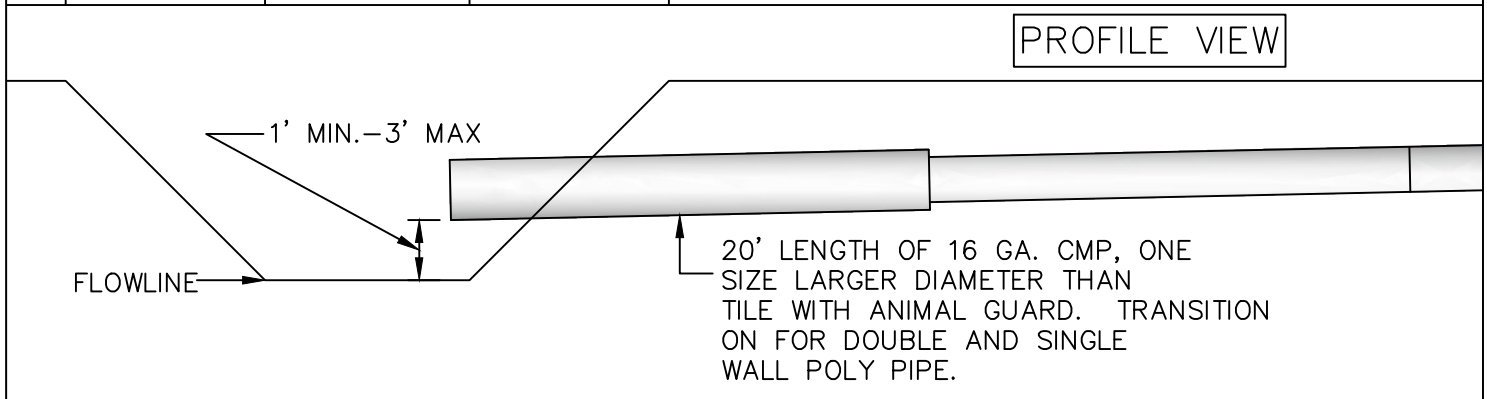
FIGURE ST-43





DRAIN OUTLET DETAIL #1

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CITY OF WESTFIELD, INDIANA

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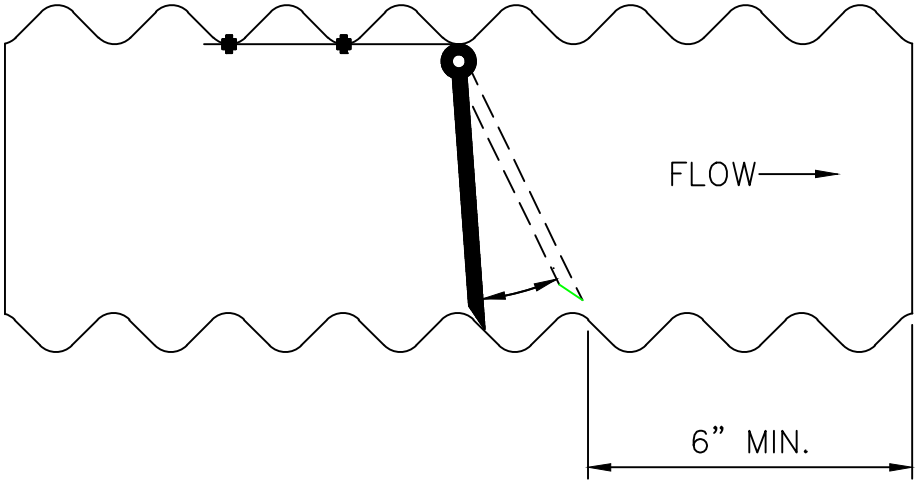
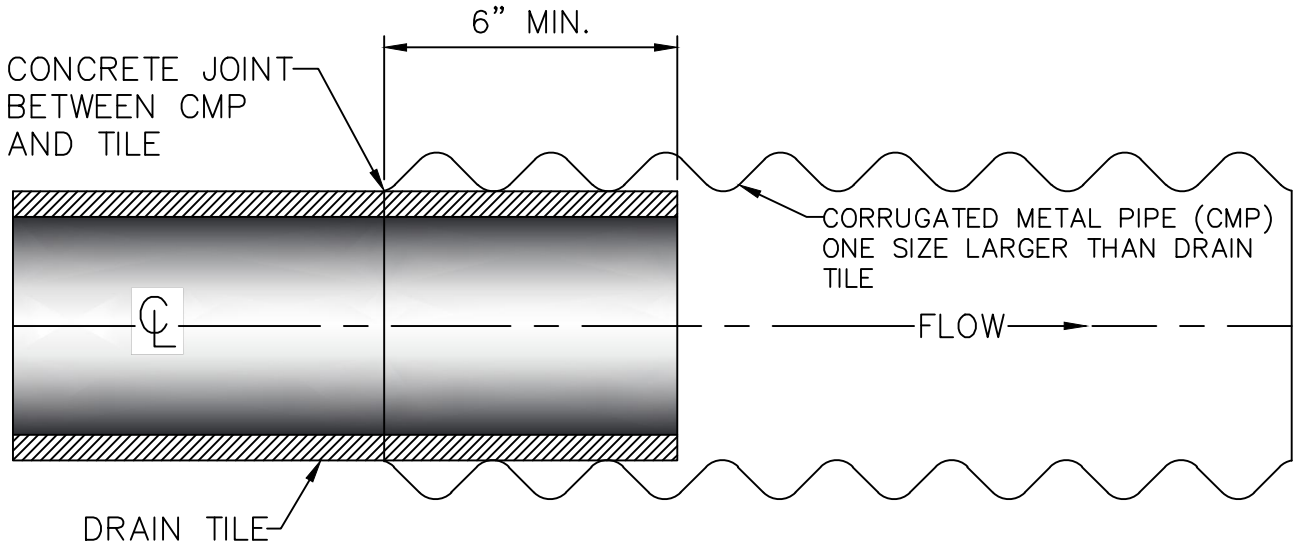
DATE

FIGURE ST–44

FLAP TYPE ANIMAL GUARD DETAIL



SECTION ON ℄ SHOWING DETAIL OF JOINT FOR DRAIN TILE AND CMP PIPE



DRAIN OUTLET DETAIL #2

CITY OF Westfield INDIANA

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CITY OF WESTFIELD, INDIANA

4/1/14
DATE

FIGURE ST-45